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EPA Superfund
Record of Decision:

HORSESHOE ROAD
EPA ID: NJD980663678
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SAYREVILLE, NJ
09/01/2000

RECORD OF DECISION

Operable Unit 1 - Buildings and Structures

Horseshoe Road Site and the Atlantic Resources Site

Sayreville, Middlesex County, New Jersey

United States Environmental Protection Agency

Region II

September 2000

DECLARATION STATEMENT

RECORD OF DECISION

SITE NAME AND LOCATION

Horseshoe Road Site (EPA ID# NJD980663678)
Atlantic Resources Site (EPA ID# NJD981558430)
Sayreville, Middlesex County, New Jersey
Operable Unit 1

STATEMENT OF BASIS AND PURPOSE

This decision document presents the Selected Remedy for buildings and structures located on the Horseshoe Road site and neighboring Atlantic Resources site, in Sayreville, Middlesex County, New Jersey. The Selected Remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record file for these sites.

The State of New Jersey concurs with the Selected Remedy.

ASSESSMENT OF THE SITE

The response action selected in this Record of Decision is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances from these sites into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Selected Remedy will address removal of site buildings, above-ground structures, and miscellaneous debris. This is the first operable unit for these sites. Additional actions will be necessary to address soil, groundwater, surface water and sediment contamination remaining at the sites. The major components of the selected response measure include:

- demolition of buildings and structures;
- surface cleaning and recycling of metal/concrete/brick;
- decontamination of concrete slabs as necessary; and
- off-site disposal of remaining demolition debris.

While this remedy does not directly address those hazardous wastes posing the principal threat at the sites, it is the necessary first step to address source material at the sites.

Removal of the buildings and above-ground structures will allow subsequent actions to address the principal threat wastes.

DECLARATION OF STATUTORY DETERMINATIONS

Part 1: Statutory Requirements

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

Part 2: Statutory Preference for Treatment

The Selected Remedy for this operable unit does not satisfy the statutory preference for treatment as a principal element of the remedy because it does not address the principal threat wastes at these sites; therefore, this statutory determination is not relevant to this action.

Part 3: Five Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on the sites above levels that will allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years of the initiation of the remedial action.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this Record of Decision. Additional information can be found in the Administrative Record file for these sites.

- Chemicals of concern and their respective concentrations may be found in the "Site Characteristics" section.
- Baseline risk represented by the chemicals of concern may be found in the "Summary of Site Risks" section.
- A discussion of cleanup levels for chemicals of concern may be found in the "Remedial Action Objectives" section.
- A discussion of source materials constituting principal threats may be found in the "Principal Threat Waste" section.

- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater are discussed in the "Current and Potential Future Site and Resource Uses" section.

- A discussion of potential land and groundwater use that will be available at the sites as a result of the Selected Remedy is discussed in the "Current and Potential Future Site and Resource Uses" section.

- Estimated capital, annual operation and maintenance (O&M), and total present worth costs are discussed in the "Description of Alternatives" section.

- Key factor(s) that led to selecting the remedy (*i.e.*, how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

Jeanne M. Fox
Regional Administrator
U.S. Environmental Protection Agency
Region II

9/1/00
Date

Decision Summary

Operable Unit 1 - Buildings and Structures

Horseshoe Road Site and Atlantic Resources Site

Sayreville, Middlesex County, New Jersey

United States Environmental Protection Agency

Region II

September 2000

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SITE NAME, LOCATION AND BRIEF DESCRIPTION

The Horseshoe Road site (EPA ID# NJD980663678) is a 17-acre property located in Sayreville, Middlesex County, New Jersey. The former chemical processing site includes three areas: (1) the Horseshoe Road Drum Dump (HRD); (2) the former Atlantic Development Corporation (ADC) facility; and (3) the Sayreville Pesticide Dump (SPD) (see Appendix I, Figures 1 & 2). The adjacent Atlantic Resources site (EPA ID# NJD981558430) is the location of the former Atlantic Resources Corporation (ARC) facility also located on Horseshoe Road. The Horseshoe Road site is on EPA's National Priorities List (NPL). The ARC site is not on the NPL; however, ARC has been the subject of EPA removal actions and site investigations and is addressed by this ROD. EPA is the lead agency for both sites, and the New Jersey Department of Environmental Protection is the support agency (NJDEP).

The Horseshoe Road and ARC sites are bordered to the north by the Raritan River (See Appendix I, Figures 1 and 2). Surface water from the sites drains into a 15-acre marsh to the west, which discharges to the Raritan River. To the southwest lies the New Jersey Steel Corporation facility. Just south of the sites lies an undeveloped wooded area, beyond which, approximately one half mile away, lies a residential neighborhood of 62 homes. To the east lie railroad tracks operated by Conrail, and Middlesex County Utilities Authority property. The nearest public water supply wells, approximately four miles away, serve about 14,000 people.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The sites first came to the attention of EPA in 1981, when a brush fire at the HRD area exposed approximately 70 partially filled drums containing acetonitrile, silver cyanide and ethyl acetate. The HRD area was used for disposal from 1972 into the early 1980s. The SPD area was also used for disposal, from about 1957 into the early 1980s. The HRD and SPD areas do not contain any buildings or structures.

The ADC area contains three abandoned buildings that were owned or leased by many companies from the early 1950s to the early 1980s. The operations included the production of roofing materials (coal tar and asbestos), sealants, polymers, urethane and epoxy resins, resin pigments, wetting agents, pesticide intermediates and recycled chlorinated solvents.

The ARC site was a precious metals recovery operation. Gold and silver were recovered from fly ash, x-ray and photographic film, circuit boards, building material and other materials. Although this area is not part of the NPL site, ARC is a source of contaminants found at the Horseshoe Road site. As with ADC, all the commercial operations at the ARC facility ceased in the early 1980s. These sites are currently abandoned and all buildings and structures have deteriorated. The sites have a history of trespassing, suspicious fires, and vandalism.

In 1985, NJDEP requested that EPA take the lead role in the cleanup of the sites. Since that time, EPA has performed 10 removal actions at the sites. These removal actions have stabilized the sites by removing more than 3,000 drums, cleaning up dioxin and mercury spills from ARC, emptying and disposing of materials found in numerous tanks and vats at both sites, and excavating and disposing of contaminated soils and debris. The last of these removal actions took place in May 1999.

The four areas, ADC, ARC, HRD, and SPD, were proposed as one site for inclusion on the NPL on May 10, 1993, and formally placed on the NPL on September 29, 1995. A group of potentially responsible parties (PRPs) for ARC sued EPA over the inclusion of ARC in the Horseshoe Road site. EPA agreed to remove ARC from the listing, without prejudice, in exchange for a withdrawal of the lawsuit. EPA may propose it as a separate NPL site in the future or incorporate ARC as part of the Horseshoe Road NPL site.

In February 1995, the Agency for Toxic Substances and Disease Registry (ATSDR) completed a health assessment that assessed the public health impact from the sites. ATSDR concluded that the sites pose an intermediate public health hazard, and recommended that more data be gathered.

In the summer of 1997, EPA initiated a remedial investigation and feasibility study (RI/FS) to characterize the nature and extent of contamination at the sites. The RI addressed groundwater, surface water, surface soils, subsurface soils, sediments and building material. The final RI Report was submitted on May 12, 1999. The findings of the RI relevant to this remedy are summarized below. A Baseline Human Health Risk Assessment (October 1999) and Focused Feasibility Study (FFS)(September 1999) have been completed and are included in the Administrative Record for these sites. Furthermore, investigations at the sites are ongoing, and EPA will be preparing a subsequent FS to address other aspects of these sites (i.e., soil, groundwater, and sediment).

In January 1992, EPA entered into a consent decree with 16 settling potentially responsible parties. Under that consent decree, EPA recovered most of its costs relating to the initial removals at the ARC site. In 1995, EPA offered these parties the opportunity to perform the RI/FS; they declined to participate. No viable PRPs have been identified for the Horseshoe Road NPL site.

COMMUNITY PARTICIPATION

The RI Report, FFS Report and Proposed Plan for the Horseshoe Road and Atlantic Resources sites were made available to the public on December 22, 1999. They can be found in the Administrative Record file and the information repository maintained at the EPA Docket Room in Region 2 and at the Sayreville Public Library in Parlin, New Jersey. The notice of the availability of these two documents was published in the Home News and Tribune on December 22, 1999. A public comment period was held from December 22, 1999 to February 3, 2000. An extension to the public comment period was not requested. In addition, a public meeting was held on January 19, 2000, to present the Proposed Plan to the community. At this meeting, representatives from EPA and ATSDR answered questions about problems at the sites and the remedial alternatives. EPA's response to the comments received during the public comment period is included in the Responsiveness Summary, which is Appendix VI of this Record of Decision (ROD).

EPA has met Sayreville Town officials on several occasions to discuss the Horseshoe Road site and Atlantic Resources site. One of the issues discussed was the town's plans for future land use of the sites. EPA plans to coordinate closely with the town to determine how best to fit EPA's cleanup plans for the sites with the town's development plans.

EPA encouraged the formation of a Community Advisory Group (CAG) in March 1999, in an effort to keep the community informed of EPA's efforts and to solicit comments and information from the affected community. The CAG meets several times per year to discuss EPA findings or site activities. The CAG is expected to continue advising EPA of community concerns during remedial design, remedial action and for future site remedies.

SCOPE AND ROLE OF OPERABLE UNIT

This ROD identifies EPA's cleanup strategy for the first phase, or operable unit, at the sites that addresses the cleanup of one portion of the site: the buildings, above-ground structures and

miscellaneous surface debris. Given the size and complexity of the Horseshoe Road and Atlantic Resources sites, EPA plans to initiate this cleanup action as part of a phased response to the problems posed by the sites. After considering the other affected media, including contaminated soil, groundwater and sediments, EPA has concluded that performing the building/structures remediation would be a logical first step to facilitate the overall cleanup of the sites. This conclusion is based upon the presence of high levels of soil and groundwater contamination near the buildings, structures and surface debris on the ADC and ARC facilities, and the expectation that subsequent remedial responses will be required to address these media.

As indicated earlier, while the investigations to date have not distinguished between the various portions of the site, the ARC property is not on the NPL with the Horseshoe Road site. This ROD addresses both the ADC portion of the Horseshoe Road NPL site, and the non-NPL ARC site (There are no buildings, structures or miscellaneous debris on the SPD or HRD portions of the NPL site). The Proposed Plan evaluated remedial responses for all above-ground structures and debris that are consistent with the anticipated future remedial responses required for the sites. Thus, the remedial action objectives and criteria for evaluation of remedial alternatives are the same for both areas.

EPA is currently collecting additional data from the Raritan River and nearby marsh for future remedial response decisions. EPA plans to address soils, groundwater and sediments in the marsh and river in future response actions at the sites.

SITE CHARACTERISTICS

Because this ROD addresses only buildings, above-ground structures and debris, this section will be limited to the portions of the remedial investigation associated with these structures. Examination of the sites show that the buildings and other structures are in advanced stages of deterioration.

Building material and flooring samples were taken from the ARC and ADC facilities. Building material samples include wipe samples, vacuum samples, ash samples, and samples of a tar-like substance found in and around the buildings. Building flooring samples include concrete samples and subflooring soil samples.

Atlantic Resources Corporation Facility

Building material samples taken from the ARC facility contained elevated levels of benzo(a)pyrene, polychlorinated biphenyls

(PCBs), antimony, arsenic, beryllium, cadmium, lead and zinc. The highest levels of these were the PCB Aroclor-1254 (30 ppm), arsenic (55.7 ppm), and antimony (34,000 ppm). Although this area is not part of the NPL site, ARC is a source of contaminants found at the sites.

Concrete building flooring samples taken from the ARC facility contained slightly elevated levels of beryllium, copper, and lead. The concrete was tested for hazardous-waste characteristics (ignitability, toxicity corrosivity and reactivity) as defined by the Resource Conservation and Recovery Act (RCRA). None of the samples demonstrated characteristics of hazardous waste.

Subflooring soil samples taken from the ARC facility contained elevated levels of tetrachloroethene up to 5.6 ppm, arsenic (23.6 ppm), and mercury (23.5 ppm).

Groundwater contaminant plumes emanating from source areas in and around the buildings contain high levels of volatile compounds. Some of the highest detections in Groundwater are as follows; trichloroethene (32 ppm), toluene (21 ppm), 1,2,4-trichlorobenzene (16 ppm), tetrachloroethene (4.0 ppm) and chlorobenzene (4.1 ppm).

The total volume of material comprising the buildings, structures and other surface debris is estimated to be 3,191 tons. This includes 3,099 tons of concrete and brick, excluding the building foundations, 84 tons of metal, and 8 tons of other debris, which includes wood and drywall. Of this material, approximately 11 percent is estimated to exhibit characteristics of hazardous waste as defined by RCRA.

Atlantic Development Corporation Facility

Building material samples taken from the ADC facility contain elevated levels of benzo(a)anthracene, chrysene, benzo(k)flouranthene, benzo(b)flouranthene, benzo(a)-pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and arsenic. The highest levels of these were benzo(a)anthracene (1,100 ppm), benzo(b)flouranthene (1,400 ppm), benzo(a)pyrene (1,100 ppm), indeno(1,2,3cd)-pyrene (300 ppm), dibenzo(a,h)anthracene (90 ppm) and arsenic (84.0 ppm).

Concrete building flooring samples taken from the ADC facility contained elevated levels of arsenic. Two samples exhibited the RCRA characteristic of toxicity as measured by the Toxicity

Characteristics Leaching Procedure for arsenic, indicating that they would require treatment prior to disposal.

Subfloor soil samples taken from the ARC facility contained elevated levels of toluene (4,300 ppm), the PCB Aroclor-1248 (1,200 ppm), and arsenic (1,510 ppm).

Groundwater contaminant plumes emanating from source areas in and around the buildings contain high levels of volatile compounds. Some of the highest detections in Groundwater are as follows; toluene (310 ppm), cis-1,2-dichloroethene (13 ppm), benzene (3.0 ppm), and trichloroethene (2.0 ppm).

The total volume of material comprising the buildings, structures and other surface debris is estimated to be 597 tons. This includes 529 tons of concrete and brick excluding the building foundations, 56 tons of metal, and 12 tons of other debris, which includes wood, asbestos containing material, and drywall. Of this material, approximately 9 percent is estimated to RCRA-characteristic waste.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Site Uses: Currently, the sites are abandoned. A Middlesex County Utility Authority(MCUA) right-of-way exists through the sites, and trespassers frequent the sites. The area immediately adjacent to the sites contains a steel facility, the MCUA, and large areas of vacant land. Much of the vacant land was at one time used by the Sayreville-Fischer Brick Company.

Conversations with the Sayreville town officials, and zoning maps indicate that the land is not currently zoned residential, and will not be zoned residential in the foreseeable future. Possible future uses include a new Sayreville road (the "Main Street Bypass"), a commuter parking lot, light commercial development, and/or recreational uses. None of the future uses are anticipated within the next three to five years.

Ground and Surface Water Uses: Currently, the groundwater under the sites is not used for drinking water, nor is it anticipated that it would be used as drinking water in the future, because there are no viable groundwater formations beneath the sites. The groundwater investigation indicates that the groundwater beneath the sites drains to the Raritan River and to an adjacent marsh. The river is used for fishing, crabbing, and recreational boating. EPA is currently evaluating the impact of the sites on the river.

SUMMARY OF SITE RISKS

Human Health Risk Assessment

In October 1999, a Baseline Human Health Risk Assessment (BHHRA) was completed for the Horseshoe Road and Atlantic Resources Corporation sites. A BHHRA is an analysis of the potential adverse health effects caused by hazardous substance releases from the sites in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of concern at the sites in various media (i.e., building material, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation. The chemicals of concern selected for the sites can be found in Appendix II, Table 1.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated. Appendix II, Table 2 provides a list of the exposure pathways considered for these sites and the rationale for the inclusion or exclusion of each pathway.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects. Toxicity data for the risk assessment were provided by the IRIS database, HEAST, and EPA's National Center for Environmental Assessment. Appendix II, Tables 3 and 4 contain toxicity data for each of the chemicals of concern.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. For carcinogens, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

where: **Risk** = a unitless probability (*e.g.*, 2×10^{-5}) of an individual's developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day), this is based on the reasonable maximum exposure calculated for the sites.
SF = slope factor (an upper-bound estimate of the probability of a response per unit intake of a chemical over a lifetime), expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (*e.g.*, $1x10^{-4}$). An excess lifetime cancer risk of $1x10^{-4}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 10,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site-related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (*e.g.*, life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (*e.g.*, liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI less than 1 indicates that, based on the sum of all HQ's from different contaminants and exposure

routes, toxic noncarcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows:

HQ = CDI/RfD

where: **CDI** = Chronic daily intake (mg/kg-day)
RfD = reference dose (mg/kg-day)

CDI and RfD are expressed in the same units and represent the same exposure period (*i.e.*, chronic, subchronic, or short-term). Appendix II, Table 5 summarizes the carcinogenic risks and non-carcinogenic hazards associated with each exposure pathway. The risk assessment indicates that there are elevated carcinogenic risks and non-carcinogenic hazards associated with building materials, on-site soils, and sediments.

Since this operable unit only addresses the above-ground structures and debris, located in the ARC and ADC facility areas, this discussion will focus on exposure scenarios on the ADC and ARC facilities where building materials contributed to the risk. Other exposure scenarios are detailed in Appendix II, Tables 1 through 5.

Exposures to area residents (as trespassers) were evaluated for surface soils, building materials, surface water, and sediment. At ADC, the total risk across all media and all exposure routes is 3.3×10^{-4} (exceeding 10^{-4}). The risk is attributed to carcinogenic PAHs in building materials and arsenic in surface soils and sediments. The total HI across all media and all exposure routes to resident trespassers is 3.1 (exceeding 1.0). The HI is attributed to arsenic in surface soils and sediments. At ARC, the total risk across all media and all exposure routes is 1.8×10^{-5}. The total HI across all media and all exposure routes is 7.2 (exceeding 1.0). The HI is attributed to antimony in building materials and Aroclor-1254 in building materials and sediments.

Exposures to future construction workers were evaluated for surface soils, subsurface soils, and building materials. At ADC, the total risk across all media and all exposure routes is 5.8×10^{-4} (exceeding 10^{-4}). The risk is attributed to carcinogenic PAHs in surface soils, subsurface soils, and building materials, and PCBs and arsenic in surface and subsurface soils. The total HI across all media and all exposure routes is 27 (exceeding 1.0). The HI is attributed to methoxychlor and arsenic in

surface and subsurface soils. At ARC, the total risk across all media and all exposure routes is $7.4x10^{-5}$. The risk is attributed to PCBs and arsenic in building materials. The total HI across all media and all exposure routes is 120 (exceeding 1.0). The HI is attributed to PCBs, antimony, and arsenic in building materials.

Exposures to future site workers were evaluated for surface soils, subsurface soils, and building materials. At ADC, the total risk across all media and all exposure routes to site workers is $3.4x10^{-2}$ (exceeding 10^{-4}). The risk is attributed to carcinogenic PAHs in surface soils, subsurface soils, and building materials, and PCBs and arsenic in surface and subsurface soils. The total HI across all media and all exposure routes is 38 (exceeding 1.0). The HI is attributed to methoxychlor and arsenic in surface and subsurface soils, and fluoranthene and pyrene compounds in building materials. At ARC, the total risk across all media and all exposure routes is $2.6x10^{-3}$ (exceeding 10^{-4}). The risk is attributed to dioxin, PCBs, and arsenic in building materials. The total HI across all media and all exposure routes is 100 (exceeding 1.0). The HI is attributed to PCBs, antimony, and arsenic in building materials.

As part of a removal action performed in 1999, debris piles were removed from the ARC buildings and structures, and the removal of this material may have removed four of the sample locations used in evaluating site risks at ARC. While the risk assessment is still considered representative of site conditions, EPA reevaluated one exposure scenario for ARC, future site workers, using only the remaining data. The revised total risk across all media and all exposure routes is $4.0x10^{-4}$ (exceeding 10^{-4}). The risk is attributed to dioxin, PCBs and arsenic in building materials. The total HI across all media and all exposure routes is 4.2 (exceeding 1.0). The HI is attributed to PCBs, antimony, and arsenic in building materials. Appendix II, Table 6 details the revised risks at ARC summarized here.

The response action selected in this Record of Decision is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances from these sites into the environment.

Ecological Risk Assessment

The ecological risk assessment for these sites has not been completed. Since this operable unit is not the final remedy for the areas to be addressed, and all the building materials will be removed, EPA has determined that this operable unit need not be

delayed to complete the ecological risk assessment. In addition, since the contaminated building material will be removed from the sites, this action will eliminate any potential ecological exposures to those materials. EPA expects to finalize the ecological risk assessment in 2000. Any concerns raised during that assessment will be addressed in future operable units that will address soils, groundwater, and sediments.

Discussion of Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper bound estimates of the risks to populations near the sites, and is highly unlikely to under-estimate actual risks related to the sites.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment.

As stated earlier, the buildings, structures and miscellaneous debris are in advanced stages of deterioration, and have reached the end of their useful life. Thus, EPA has developed remedial action objectives that focus on the safety concerns associated with abandoned industrial buildings and structures, and the hazards posed by the surface media as if it were all assumed to be debris. These remedial action objectives do not contemplate the future use of these buildings and structures.

In addition, soil contamination has been identified under various buildings and structures. EPA plans to leave in-ground concrete associated with buildings and structures in place, where appropriate, as an interim barrier limiting exposure to contaminated soils underneath. Contaminated in-ground concrete also would remain in place, to be addressed as part of a soil or source control remedy for the sites at a later date. As previously discussed, future operable units will address groundwater, soil, surface water and sediment contamination remaining at the sites.

The following Remedial Action Objectives were established for this operable unit.

- Prevent or minimize human exposure to contaminants in building materials.
- Prevent or minimize uptake of contaminants in building materials by biota.
- Prevent or minimize migration of contaminants in building materials via windblown dust and surface runoff.

No site-specific cleanup levels are required for this operable unit, because the active remedial actions considered call for dismantling all the structures.

DESCRIPTION OF ALTERNATIVES

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requires that each remedial alternative be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize

permanent solutions and alternative treatment technologies and resource recovery technologies to the maximum extent practicable. In audition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility or volume of hazardous substances.

The implementation period for remedial alternatives listed below does not include the time for remedial design, which typically takes about 15 months to perform. These remedial alternatives are permanent remedies for the above-ground buildings, structures and miscellaneous debris.

The remedial alternatives considered for the sites are as follows.

Alternative 1: No Action

Capital Cost:	$0
Annual Operation and Maintenance:	$0
Present Worth:	$0
Time to Implement:	not applicable

The no action alternative is considered in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and provides a baseline for comparison with the other alternatives. Under this alternative, no further action would be taken, and the current status of the buildings, structures and debris would remain unchanged. The existing fence would continue to discourage site entry; however, trespassers would continue to gain access to the sites, resulting in potential exposure to contaminants present on building and structure surfaces. Because no action results in contaminants remaining on the sites above acceptable levels, a review of the sites at least every five years is required.

Alternative 2: Demolition of Buildings and Structures, and Off-site Disposal of Demolition Debris; Decontamination of Concrete Slabs

Capital Cost:	Atlantic Resources	$ 936,692
	Horseshoe Road (ADC)	$ 484,037
	Total	$ 1,420,730
Annual Operation and Maintenance:		$ 0
Present Worth:		$ 1,420,730
Time to Implement:		12 Months

Under this alternative, all buildings and structures would be demolished using standard demolition methods. The resulting

debris would be segregated prior to off-site disposal based on contaminant concentrations. The concrete building slabs would remain intact after demolition of the above-ground structures. Where necessary, the concrete slabs would be decontaminated and/or coated with a sealant, to provide a barrier to future exposure. The existing site fencing would be repaired and upgraded.

Prior to demolition, characterization of potential asbestos containing material (ACM) and lead-based paint would be performed, and any ACM or lead-based paint would be removed for appropriate disposal. Also, any liquid wastes or sludges remaining in tanks, or abandoned process equipment would be characterized and removed for off-site disposal.

Under this alternative, all of the building materials except the building foundations will be disposed of off-site; therefore, EPA does not anticipate any operation and maintenance cost associated with this remedy.

Because this remedy will result in contaminants remaining on the sites above levels that will allow for unrestricted use of the sites, a five year review will be required.

Alternative 3: Demolition of Buildings and Structures, Surface Cleaning, Recycling of Metal/Concrete/Brick, and Off-site Disposal of Remaining Demolition Debris; Decontamination of Concrete Slabs

Capital Cost:	Atlantic Resources	$ 863,890
	Horseshoe Road (ADC)	$ 522,021
	Total	$ 1,385,911
Annual Operation and Maintenance:		$ 0
Present Worth:		$ 1,385,911
Time to Implement:		13 Months

As with Alternative 2, this alternative includes the demolition of all buildings and structures using standard demolition methods, but leaving the concrete building slabs in place. Debris generated during the demolition would be segregated for off-site disposal and recycling. The concrete building slabs would remain intact after demolition of the above-ground structures. Where necessary, the concrete slabs would be decontaminated and coated with a sealant, to provide a barrier to future exposure. Non-contaminated metal debris and metal that has been surface-cleaned to remove contamination would be recycled to the extent practicable. Non-contaminated concrete and brick debris would also be recycled. Some of the recyclable

concrete and brick may be saved for future on-site use, if it can pass EPA and State requirements for clean fill. Contaminated concrete and brick would not be surface-cleaned, because it is expected that surface contamination would have migrated into the porous concrete and brick, and that these materials cannot be readily decontaminated. The existing site fencing would be repaired and upgraded.

Prior to demolition, characterization of potential asbestos containing material and lead-based paint would be performed. If identified, these materials would be removed for appropriate disposal. Also, any liquid wastes or sludges remaining in tanks, or abandoned process equipment would be characterized and removed for off-site disposal.

Under this alternative, all of the building materials except the building foundations will be recycled or disposed of off-site; therefore, EPA does not anticipate any operation and maintenance cost associated with this remedy.

Because this remedy will result in contaminants remaining on-site above levels that will allow for unrestricted use of the sites, a five year review will be required.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual response measure against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each response measure against the criteria.

Threshold Criteria - *The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy.*

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1. Overall Protection of Human Health and the Environment
Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled,

through treatment, engineering controls, and/or institutional controls.

Alternative 1, the no action alternative, would not be protective of human health and the environment because the sites would remain in their current condition. Under this alternative, contaminated building material would remain on the sites.

Under Alternatives 2 and 3, all contaminated structures and debris will be removed from the sites, thereby reducing the risks of human and ecological exposure via ingestion, inhalation and dermal contact, and removing a potential source of off-site contaminant migration.

2. Compliance with applicable or relevant and appropriate requirements (ARARs)

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of

other Federal and State environmental statutes or provides a basis for invoking a waiver.

Alternative 1 Because ARARs apply to actions taken, they are not applicable to the no action alternative.

Alternatives 2 and 3 would comply with ARARs. Major ARARs are briefly described below.

Air standards set forth in 40 CFR 50 and NJAC 7:27-13 would be addressed through monitoring during remedial activities.

Hazardous waste identification and listing would be performed in accordance with 40 CFR 261 and NJAC 7:25G-5. Hazardous waste disposal would be performed in accordance with 40 CFR 268.45 and NJAC 7:26G11.

Lead-based paint and asbestos characterization and disposal would be performed in accordance with 40 CFR 745(proposed), 40 CFR 61.145, NJAC 8:60, and NJAC 5:17.

Transport and disposal of solid and hazardous wastes would be performed in accordance with regulations specified by the U.S. Department of Transportation (DOT)49 CFR 170-179, RCRA (40 CFR 258, 263, 264, and 265) and New Jersey (NJAC 7:26G, NJAC 16:49).

Primary Balancing Criteria - *The next five criteria, criteria 3 through 7, are known as "primary balancing criteria." These criteria are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions.*

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3. Long-term effectiveness and permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Alternative 1 offers no long-term effectiveness and permanence.

Alternatives 2 and 3 provide a permanent solution by removing contaminated buildings and structures from the sites.

4. Reduction of toxicity, mobility, or volume

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative 1 does not include treatment as a component of the remedy. Therefore, this alternative would not reduce the toxicity, mobility, or volume of contamination at the sites.

Although Alternatives 2 and 3 do not contain treatment as a major part of the remedy, they would reduce contaminant mobility on the remaining concrete foundation by sealing any contaminated surfaces, and hazardous debris would be stabilized through encapsulation prior to off-site disposal.

Furthermore, Alternative 3 recycles site materials to the extent practical, which reduces the amount of material to be landfilled.

5. Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1, No Action, poses no short-term risks.

Alternatives 2 and 3 would require a short implementation period, during which time the risks due to chemical exposures are expected to be low and limited to site workers. The use of standard health and safety practices would minimize worker exposures. Standard dust suppression and monitoring techniques during demolition would further reduce any potential for dust-related exposures. Although trucks would be required to take materials off-site, truck traffic will be routed to minimize impacts to the community and the use of truck tarps would further limit exposures.

6. Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 1 requires no implementation.

Alternatives 2 and 3 are readily implementable with standard construction equipment and standard practices. Since Alternative 3 requires sampling of metals, brick and concrete, and surface decontamination of some of the metals before they can be recycled, implementation time for this alternative would vary depending on the amount of material that needs to be decontaminated. Implementability for Alternatives 2 and 3 would be high.

7. Cost

Includes estimated capital and O&M costs, and net present worth value of capital and O&M costs. None of the alternatives will require operation and maintenance costs.

The Alternative 1 cost is $0. The Alternative 2 cost is estimated to be $936,692 for the ARC site and $484,037 for the Horseshoe Road site (ADC), for a total of $1,420,730. The Alternative 3 cost is estimated to be $863,890 for the ARC site and $522,021 for the Horseshoe Road site (ADC), for a total of $1,385,911.

Modifying Criteria - *The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.*

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8. State acceptance

Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.

The State of New Jersey concurs with Alternative 3.

9. Community acceptance

Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

EPA solicited input from the community on the remedial response measures proposed for the sites. The attached Responsiveness Summary addresses the comments received by the community. The community is supportive of Alternative 3.

PRINCIPAL THREAT WASTE

This action is the first operable unit for these sites. This action addresses the buildings, structures and debris, none of which are considered principal threat wastes for these sites. Principal threat wastes for these sites include contaminants in the soil and sediment. These media will be addressed in subsequent operable units.

SELECTED REMEDY

Based upon consideration of the results of the site investigation, the requirements of CERCLA, the detailed analysis of the response measures, and public comment, EPA has determined that Alternative 3 is the appropriate remedy for addressing the buildings and above-ground structures at the sites. Alternative 3 satisfies the requirements of CERCLA §121 and the NCP's nine evaluation criteria for remedial alternatives, 40 CFR §300.430(e)(9). Alternative 3 is comprised of the following components:

- demolition of buildings and structures;
- surface cleaning and recycling of metal/concrete/brick;
- decontamination of concrete slabs as necessary; and
- off-site disposal of remaining demolition debris.

EPA has selected Alternative 3 because the no action alternative is not acceptable for these sites, and Alternative 3 incorporates the recycling of some of the building materials. While recycling does add a month to the implementation time (13 months instead of 12 months for Alternative 2), EPA determined that the added benefit of recycling some of the material, instead of taking up more landfill space, is worth the minimal additional time.

In addition, the cost of Alternative 3 is slightly less than Alternative 2. A summary of the estimated remedy cost for Alternative 3 is included as Appendix II, Table 7 of this ROD. The information in the cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an ESD, or a ROD amendment. This is

an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

The selection of Alternative 3 provides the best balance of trade-offs among response measures with respect to the nine evaluation criteria. EPA believes that Alternative 3 would be protective of human health and the environment, would be cost effective, and would utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

STATUTORY DETERMINATIONS

As was previously noted, CERCLA §121(b)(1) mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA §121(d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4).

Protection of Human Health and the Environment

The Selected Remedy, Alternative 3, will eliminate all significant risk to human health and the environment from site contaminants found on the building materials through off-site disposal of the contaminated building materials.

Compliance with ARARs

Alternative 3 will comply with ARARs as described below.

Air standards set forth in 40 CFR 50 and NJAC 7:27-13 will be addressed through monitoring during remedial activities.

Hazardous waste identification and listing will be performed in accordance with 40 CFR 261 and NJAC 7:25G-5. Hazardous waste disposal will be performed in accordance with 40 CFR 268.45 and NJAC 7:26G11

Lead-based paint and asbestos characterization and disposal will be performed in accordance with 40 CFR 745(proposed), 40 CFR 61.145, NJAC 8:60, and NJAC 5:17.

Transport and disposal of solid and hazardous wastes will be performed in accordance with regulations specified by the U.S. Department of Transportation (DOT)49 CFR 170-179, RCRA (40 CFR 258, 263, 264, and 265) and New Jersey (NJAC 7:26G, NJAC 16:49).

Cost Effectiveness

In the lead agency's judgment, the Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP §300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (*i.e.*, were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

The total present worth for Alternative 3 is estimated to be $1,385,911. Alternative 1 was determined not to be an acceptable alternative. Alternative 2 is estimated to cost $1,420,730.

Therefore, the selected alternative is cost effective as it has been determined to provide the greatest overall protectiveness for its present worth ccsts.

Utilization of Permanent Solutions and Alternative Treatment Technologies

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the sites. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against off-site treatment and disposal and considering State and community acceptance.

The Selected Remedy satisfies the criteria for long-term effectiveness and permanence by removing all the contaminated building material from the sites. The selected does not present short term risks different from the other alternatives. There are no special implementability issues since the remedy employs standard technologies.

Preference for Treatment as a Principal Element

This remedy does not address principal threat wastes for the sites; therefore, this statutory determination is not relevant to this action.

Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on the sites above levels that will not allow for unlimited unrestricted use of the sites, a statutory review will be conducted within five years of the initiation of the remedial action for this operable unit.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Horseshoe Road and Atlantic Resources sites was released for public comment in December 1999. The Proposed Plan identified Alternative 3, Demolition of Buildings and Structures, Surface Cleaning, Recycling of Metal/Concrete/Brick, and Off-site Disposal of Remaining Demolition Debris; and Decontamination of Concrete Slabs, as the Preferred Alternative for Addressing the buildings. EPA reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

APPENDIX I FIGURES

Horseshoe Road and Atlantic Resources Sites

Sayreville, New Jersey

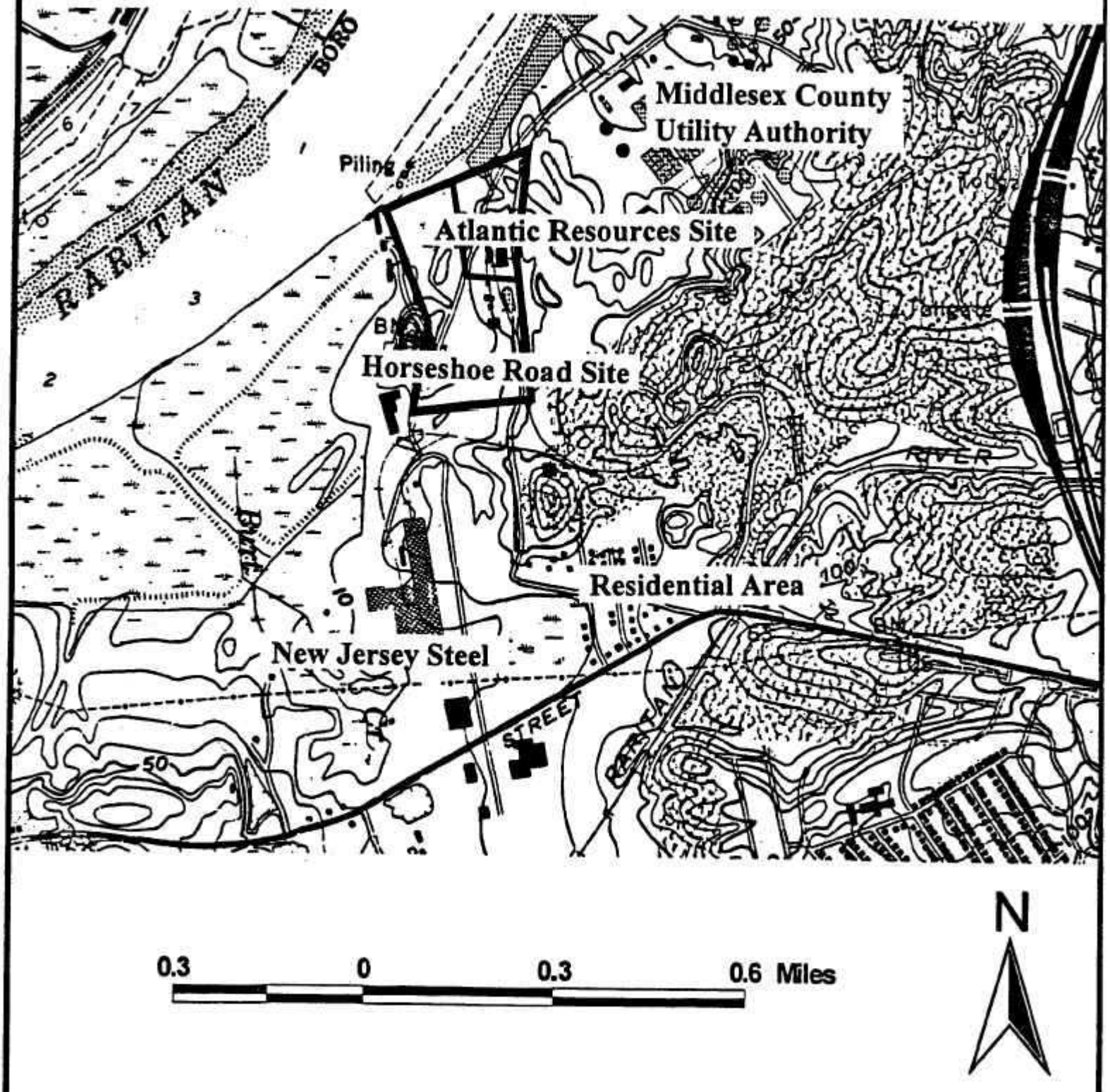
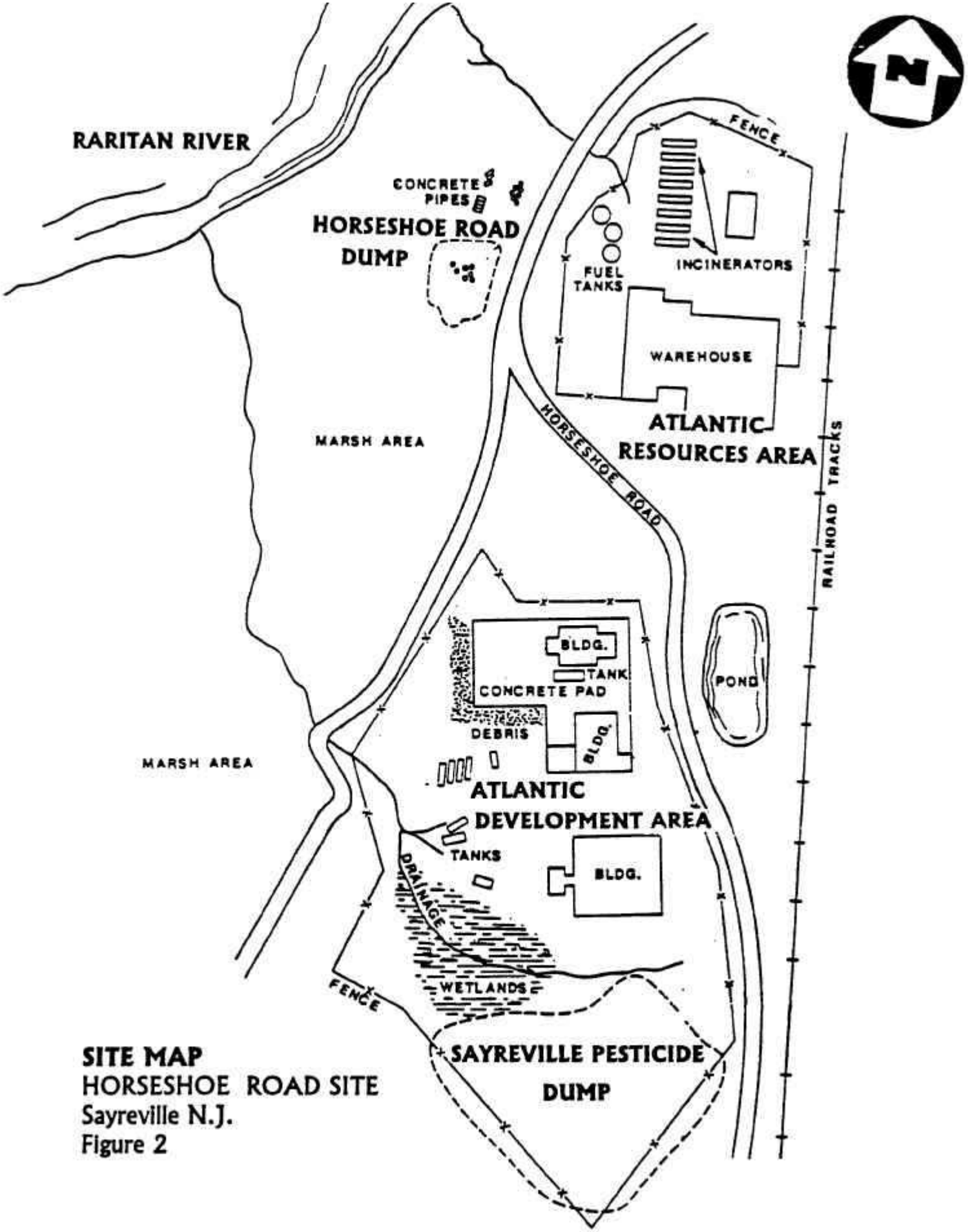


Figure 1



SITE MAP
HORSESHOE ROAD SITE
Sayreville N.J.
Figure 2

APPENDIX II TABLES

Table 1

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: AOC 1 - HRDD

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Dieldrin	ug/kg	24	N/A (3)	120	NJ	ug/kg	120	Max	(1)	24	Mean-N	(2)
Aroclor-1248	ug/kg	1678	N/A (3)	9500	NJD	ug/kg	9500	Max	(1)	1678	Mean-N	(2)
Aroclor-1254	ug/kg	396	N/A (3)	850	J	ug/kg	850	Max	(1)	396	Mean-N	(2)
Aroclor-1260	ug/kg	207	N/A (3)	720	DJ	ug/kg	720	Max	(1)	207	Mean-N	(2)
Aluminum	mg/kg	7803	N/A (3)	14800		mg/kg	14250	95% UCL-T	(3)	6975	Mean-T	(3)
Antimony	mg/kg	2.1	N/A (3)	3.4	BNJ	mg/kg	3.4	Max	(1)	2.1	Mean-N	(2)
Arsenic	mg/kg	33	N/A (3)	68	*J	mg/kg	53	95% UCL-T	(3)	30	Mean-T	(3)
Cadmium	mg/kg	2.3	N/A (3)	4.5		mg/kg	4.5	Max	(1)	2.3	Mean-N	(2)
Copper	mg/kg	186	N/A (3)	433	*J	mg/kg	433	Max	(1)	186	Mean-N	(2)
Manganese	mg/kg	155	N/A (3)	420	NJ	mg/kg	420	Max	(1)	155	Mean-N	(2)
Nickel	mg/kg	44	N/A (3)	106		mg/kg	108	Max	(1)	44	Mean-N	(2)
Silver	mg/kg	16	N/A (3)	30		mg/kg	30	Max	(1)	16	Mean-N	(2)
Thallium	mg/kg	0.63	N/A (3)	1	B	mg/kg	1	Max	(1)	0.63	Mean-N	(2)
Vanadium	mg/kg	40	N/A (3)	78		mg/kg	64	95% UCL-T	(3)	37	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: AOC 2 - ADC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)anthracene	ug/kg	4534	N/A (3)	21000	J	ug/kg	21000	Max	(1)	4534	Mean-N	(2)
Benzo(b)fluoranthene	ug/kg	7841	N/A (3)	30000		ug/kg	30000	Max	(1)	7841	Mean-N	(2)
Benzo(a)pyrene	ug/kg	5343	N/A (3)	20000	J	ug/kg	20000	Max	(1)	5343	Mean-N	(2)
Indeno(1,2,3-cd)pyrene	ug/kg	3251	N/A (3)	12000		ug/kg	12000	Max	(1)	3251	Mean-N	(2)
Dibenzo(a,h)anthracene	ug/kg	2532	N/A (3)	2300		ug/kg	2300	Max	(1)	2532	Mean-N	(2)
Aldrin	ug/kg	114	N/A (3)	400	NJ	ug/kg	400	Max	(1)	114	Mean-N	(2)
Dieldrin	ug/kg	200	N/A (3)	740	J	ug/kg	740	Max	(1)	200	Mean-N	(2)
Methoxychlor	ug/kg	72823	N/A (3)	980000	JD	ug/kg	960000	Max	(1)	72823	Mean-N	(2)
Aroclor-1248	ug/kg	7359	N/A (3)	34000	JD	ug/kg	34000	Max	(1)	7359	Mean-N	(2)
Aroclor-1260	ug/kg	1500	N/A (3)	2500	NJ	ug/kg	2500	Max	(1)	1500	Mean-N	(2)
2,3,7,8-TCDD equiv.	ug/kg	0.15	N/A (3)	0.308		ug/kg	0.308	Max	(1)	0.15	Mean-N	(2)
Antimony	mg/kg	10	N/A (3)	84.1	NJ	mg/kg	32	95% UCL-T	(3)	2.7	Mean-T	(3)
Arsenic	mg/kg	426	N/A (3)	3640		mg/kg	3640	95% UCL-T	(3)	46	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: AOC 3 - SPD

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)anthracene	ug/kg	959	N/A (3)	7300	J	ug/kg	1701	95% UCL-T	(3)	388	Mean-T	(3)
Benzo(b)fluoranthene	ug/kg	996	N/A (3)	7700	J	ug/kg	2883	95% UCL-T	(3)	337	Mean-T	(3)
Benzo(a)pyrene	ug/kg	797	N/A (3)	6500	J	ug/kg	1468	95% UCL-T	(3)	324	Mean-T	(3)
Indeno(1,2,3-cd)pyrene	ug/kg	704	N/A (3)	4000	J	ug/kg	1302	95% UCL-T	(3)	369	Mean-T	(3)
Methoxychlor	ug/kg	50976	N/A (3)	650000	JD	ug/kg	650000	Max	(1)	50976	Mean-N	(3)
Aluminum	mg/kg	5036	N/A (3)	14200		mg/kg	8432	95% UCL-T	(3)	4024	Mean-T	(2)
Antimony	mg/kg	4.0	N/A (3)	23		mg/kg	17	95% UCL-T	(3)	1.6	Mean-T	(3)
Arsenic	mg/kg	13	N/A (3)	32		mg/kg	24	95% UCL-T	(3)	10	Mean-T	(3)
Copper	mg/kg	308	N/A (3)	2210		mg/kg	1519	95% UCL-T	(3)	86	Mean-T	(3)
Manganese	mg/kg	95	N/A (3)	326		mg/kg	215	95% UCL-T	(3)	58	Mean-T	(3)
Thallium	mg/kg	0.73	N/A (3)	1.3	B	mg/kg	0.92	95% UCL-T	(3)	0.68	Mean-T	(3)
Vanadium	mg/kg	30	N/A (3)	49		mg/kg	37	95% UCL-T	(3)	28	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: AOC 4 - ARC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(b)fluoranthene	ug/kg	1694	N/A (3)	2600		ug/kg	2600	Max	(1)	1694	Mean-N	(2)
Benzo(a)pyrene	ug/kg	1640	N/A (3)	1800	J	ug/kg	1800	Max	(1)	1640	Mean-N	(2)
Hexachlorobutadiene	ug/kg	1879	N/A (3)	6800	J	ug/kg	6800	Max	(1)	1879	Mean-N	(2)
Hexachlorocyclopentadiene	ug/kg	22720	N/A (3)	340000	JD	ug/kg	57440	95% UCL-T	(3)	846	Mean-T	(3)
Aldrin	ug/kg	37	N/A (3)	570	NJD	ug/kg	22	95% UCL-T	(3)	1.6	Mean-T	(3)
Aroclor-1248	ug/kg	937	N/A (3)	15000	JD	ug/kg	891	95% UCL-T	(3)	43	Mean-T	(3)
Aroclor-1254	ug/kg	753	N/A (3)	10000	ECJ	ug/kg	1941	95% UCL-T	(3)	62	Mean-T	(3)
Aroclor-1260	ug/kg	348	N/A (3)	5000	JD	ug/kg	465	95% UCL-T	(3)	44	Mean-T	(3)
2,3,7,8-TCDD equiv.	ug/kg	0.12	N/A (3)	0.20		ug/kg	0.2	Max	(1)	0.12	Mean-N	(2)
Aluminum	mg/kg	6918	N/A (3)	15500		mg/kg	15500	Max	(1)	6918	Mean-N	(2)
Antimony	mg/kg	6.5	N/A (3)	23		mg/kg	18	95% UCL-T	(3)	3.5	Mean-T	(3)
Arsenic	mg/kg	12	N/A (3)	30		mg/kg	27	95% UCL-T	(3)	9.7	Mean-T	(3)
Cadmium	mg/kg	8.4	N/A (3)	103		mg/kg	37	95% UCL-T	(3)	1.3	Mean-T	(3)
Copper	mg/kg	174	N/A (3)	591		mg/kg	591	Max	(1)	174	Mean-N	(2)
Manganese	mg/kg	123	N/A (3)	461		mg/kg	461	Max	(1)	123	Mean-N	(2)
Nickel	mg/kg	62	N/A (3)	507	J	mg/kg	296	95% UCL-T	(3)	21	Mean-T	(3)
Silver	mg/kg	66	N/A (3)	287	NJ	mg/kg	287	Max	(1)	66	Mean-N	(2)
Thallium	mg/kg	0.59	N/A (3)	1.7	B	mg/kg	0.72	95% UCL-T	(3)	0.53	Mean-T	(3)
Zinc	mg/kg	2016	N/A (3)	31400	N*EJ	mg/kg	9172	95% UCL-T	(3)	108	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: AOC 1 - HRDD

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1248	ug/kg	341	N/A (3)	1300	D	ug/kg	1300	Max	(1)	341	Mean-N	(2)
Aroclor-1254	ug/kg	40	N/A (3)	96		ug/kg	96	Max	(1)	40	Mean-N	(2)
Aroclor-1260	ug/kg	787	N/A (3)	3100	D	ug/kg	3100	Max	(1)	787	Mean-N	(2)
Aluminum	mg/kg	8282	N/A (3)	11800	*	mg/kg	10685	95% UCL-T	(3)	8056	Mean-T	(3)
Antimony	mg/kg	1.5	N/A (3)	5.1	BNJ	mg/kg	5.1	Max	(1)	1.5	Mean-N	(2)
Arsenic	mg/kg	14.7	N/A (3)	27.1		mg/kg	24.5	95% UCL-T	(3)	13.5	Mean-T	(3)
Cadmium	mg/kg	2.1	N/A (3)	5.1		mg/kg	4.4	95% UCL-T	(3)	1.8	Mean-T	(3)
Copper	mg/kg	402	N/A (3)	1222		mg/kg	1222	Max	(1)	402	Mean-N	(2)
Manganese	mg/kg	244	N/A (3)	486	*	mg/kg	486	Max	(1)	244	Mean-N	(2)
Nickel	mg/kg	50	N/A (3)	174		mg/kg	174	Max	(1)	50	Mean-N	(2)
Thallium	mg/kg	0.93	N/A (3)	2.5		mg/kg	2.5	Max	(1)	0.93	Mean-N	(2)
Vanadium	mg/kg	36.3	N/A (3)	50		mg/kg	50	Max	(1)	38.3	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Medium: Test Pit Soil
Exposure Medium: Test Pit Soil
Exposure Point: AOC1 - HRDD-TP

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)pyrene	ug/kg	517	N/A (3)	3300	J	ug/kg	1346	95% UCL-T	(3)	184	Mean-T	(3)
Aroclor-1246	ug/kg	3882	N/A (3)	41000		ug/kg	41000	Max	(1)	3882	Mean-N	(2)
Aroclor-1254	ug/kg	1105	N/A (3)	6200		ug/kg	6200	Max	(1)	1105	Mean-N	(2)
Antimony	mg/kg	150	N/A (3)	2000		mg/kg	1306	95% UCL-T	(3)	3.2	Mean-T	(3)
Arsenic	mg/kg	106	N/A (3)	853	NJ	mg/kg	707	95% UCL-T	(3)	33	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: AOC 2 - ADC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,2-Dichloroethene	ug/kg	26703	N/A (3)	390000	D	ug/kg	390000	Max	(1)	26703	Mean-N	(2)
Benzo(b)fluoranthene	ug/kg	2126	N/A (3)	30000	J	ug/kg	3149	95% UCL-T	(3)	490	Mean-T	(3)
Benzo(a)pyrene	ug/kg	2143	N/A (3)	26000	J	ug/kg	4713	95% UCL-T	(3)	563	Mean-T	(3)
Methoxychlor	ug/kg	64633	N/A (3)	760000	JD	ug/kg	760000	Max	(1)	64833	Mean-N	(2)
Aroclor-1242	ug/kg	2610	N/A (3)	17000	JD	ug/kg	10536	95% UCL-T	(3)	76.8	Mean-T	(3)
Aroclor-1248	ug/kg	7261	N/A (3)	74000	J	ug/kg	74000	Max	(1)	7261	Mean-N	(2)
Arsenic	mg/kg	130	N/A (3)	1120	J	mg/kg	828	95% UCL-T	(3)	21	Mean-T	(3)
Thallium	mg/kg	1.3	N/A (3)	3.5	BJ	mg/kg	1.8	95% UCL-T	(3)	1.0	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: AOC 3 - SPD

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)pyrene	ug/kg	341	N/A (3)	93	J	ug/kg	93	Max	(1)	93	Max	(4)
Aroclor-1254	ug/kg	77	N/A (3)	450		ug/kg	164	95% UCL-T	(3)	36	Mean-T	(3)
Aroclor-1260	ug/kg	78	N/A (3)	400		ug/kg	176	95% UCL-T	(3)	36	Mean-T	(3)
Methoxychlor	ug/kg	2241	N/A (3)	18000	JD	ug/kg	18000	Max	(1)	2241	Mean-N	(2)
Aluminum	mg/kg	5267	N/A (3)	16400	J	mg/kg	9082	95% UCL-T	(3)	4106	Mean-T	(3)
Antimony	mg/kg	0.62	N/A (3)	1.9	B	mg/kg	0.83	95% UCL-T	(3)	0.54	Mean-T	(3)
Arsenic	mg/kg	8.6	N/A (3)	33.6	NJ	mg/kg	29	95% UCL-T	(3)	5.0	Mean-T	(3)
Cadmium	mg/kg	0.4	N/A (3)	1.5		mg/kg	0.67	95% UCL-T	(3)	0.22	Mean-T	(3)
Manganese	mg/kg	63	N/A (3)	435	*	mg/kg	197	95% UCL-T	(3)	23	Mean-T	(3)
Thallium	mg/kg	0.8	N/A (3)	2.8		mg/kg	1.2	95% UCL-T	(3)	0.65	Mean-T	(3)
Vanadium	mg/kg	25.1	N/A (3)	50.3		mg/kg	33	95% UCL-T	(3)	23	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.
(4) Mean concentration exceeds the maximum concentration, due to high detection limits for nondetects.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Medium: Test Pit Soil
Exposure Medium: Test Pit Soil
Exposure Point: AOC 3 - SPD-TP

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Hexachloroethane	ug/kg	1300000	N/A (3)	25000000	JD	ug/kg	10201148	95% UCL-T	(3)	1751	Mean-T	(3)
Benzo(a)pyrene	ug/kg	2000	N/A (3)	4700	J	ug/kg	4700	Max	(1)	2000	Mean-N	(2)
Dibenzo(a,h)anthracene	ug/kg	1794	N/A (3)	920	J	ug/kg	920	Max	(1)	920	Max	(4)
Aroclor-1246	ug/kg	3331	N/A (3)	21000		ug/kg	21000	Max	(1)	3331	Mean-N	(2)
Aroclor-1254	ug/kg	764	N/A (3)	6000	J	ug/kg	6000	Max	(1)	764	Mean-N	(2)
Arsenic	mg/kg	21.5	N/A (3)	77.2	*EJ	mg/kg	77.2	Max	(1)	21.5	Mean-N	(2)
Copper	mg/kg	3502	N/A (3)	32300	*EJ	mg/kg	32300	Max	(1)	3502	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: AOC 4 - ARC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Tetrachloroethene	ug/kg	1434	N/A (3)	23000		ug/kg	19252	95% UCL-T	(3)	29.9	Mean-T	(3)
Chlorobenzene	ug/kg	4593	N/A (3)	80000		ug/kg	29736	95% UCL-T	(3)	35	Mean-T	(3)
Benzo(a)anthracene	ug/kg	521	N/A (3)	2250	J	ug/kg	793	95% UCL-T	(3)	351	Mean-T	(3)
Benzo(b)fluoranthene	ug/kg	556	N/A (3)	2550	J	ug/kg	830	95% UCL-T	(3)	380	Mean-T	(3)
Benzo(a)pyrene	ug/kg	523	N/A (3)	1950	J	ug/kg	767	95% UCL-T	(3)	374	Mean-T	(3)
Indeno(1,2,3-cd)pyrene	ug/kg	478	N/A (3)	1150	J	ug/kg	693	95% UCL-T	(3)	363	Mean-T	(3)
1,2,4-Trichlorobenzene	ug/kg	35440	N/A (3)	600000	JD	ug/kg	112687	95% UCL-T	(3)	632	Mean-T	(3)
Aldrin	ug/kg	5	N/A (3)	53	NJD	ug/kg	5.7	95% UCL-T	(3)	1.6	Mean-T	(3)
Aroclor-1246	ug/kg	126	N/A (3)	1600	JD	ug/kg	149	95% UCL-T	(3)	34	Mean-T	(3)
Aroclor-1254	ug/kg	42	N/A (3)	130	J	ug/kg	56	95% UCL-T	(3)	26	Mean-T	(3)
Aluminum	mg/kg	8615	N/A (3)	20200		mg/kg	13018	95% UCL-T	(3)	7140	Mean-T	(3)
Antimony	mg/kg	1.4	N/A (3)	3.4	B	mg/kg	2.1	95% UCL-T	(3)	1.1	Mean-T	(3)
Arsenic	mg/kg	9.3	N/A (3)	18.5		mg/kg	13.0	95% UCL-T	(3)	7.8	Mean-T	(3)
Manganese	mg/kg	70	N/A (3)	183	NJ	mg/kg	133	95% UCL-T	(3)	46	Mean-T	(3)
Thallium	mg/kg	0.92	N/A (3)	2.2	B	mg/kg	1.1	95% UCL-T	(3)	0.82	Mean-T	(3)
Vanadium	mg/kg	34.7	N/A (3)	53.9		mg/kg	43	95% UCL-T	(3)	32	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: AOC 1 - HRDD

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Vinyl Chloride	ug/l	5	N/A (3)	4	J	ug/l	4	Max	(1)	4	Max	(4)
Antimony	ug/l	8	N/A (3)	10	B	ug/l	10	Max	(1)	8	Mean-N	(2)
Arsenic	ug/l	46	N/A (3)	89.6		ug/l	89.6	Max	(1)	46	Mean-N	(2)
Cadmium	ug/l	6	N/A (3)	8.5		ug/l	8.5	Max	(1)	6.1	Mean-N	(2)
Copper	ug/l	780	N/A (3)	1230	EJ	ug/l	1230	Max	(1)	780	Mean-N	(2)
Manganese	ug/l	880	N/A (3)	1030	EJ	ug/l	1030	Max	(1)	880	Mean-N	(2)
Nickel	ug/l	136	N/A (3)	144		ug/l	144	Max	(1)	136	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.
(4) Mean concentration exceeds the maximum concentration, due to high detection limits for nondetects.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: AOC 2 - ADC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Vinyl Chloride	ug/l	7.6	N/A (3)	36		ug/l	9.8	95% UCL-T	(3)	5.9	Mean-T	(3)
Antimony	ug/l	6.1	N/A (3)	34.5	JB	ug/l	9.6	95% UCL-T	(3)	3.7	Mean-T	(3)
Arsenic	ug/l	83	N/A (3)	467	NJ	ug/l	467	Max	(1)	83	Mean-N	(2)
Manganese	ug/l	320	N/A (3)	919	J	ug/l	673	95% UCL-T	(3)	245	Mean-T	(3)
Thallium	ug/l	1.9	N/A (3)	3.9	JB	ug/l	2.3	95% UCL-T	(3)	1.8	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: AOC 3 - SPD

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Methoxychlor	ug/l	0.63	N/A (3)	0.91	J	ug/l	0.91	Max	(1)	0.63	Mean-N	(2)
Aluminum	ug/l	1311	N/A (3)	2610		ug/l	2610	Max	(1)	1311	Mean-N	(2)
Arsenic	ug/l	6.2	N/A (3)	9.9	JB	ug/l	9.9	Max	(1)	6.2	Mean-N	(2)
Copper	ug/l	120	N/A (3)	247	EJ	ug/l	247	Max	(1)	120	Mean-N	(2)
Manganese	ug/l	661	N/A (3)	919	J	ug/l	919	Max	(1)	661	Mean-N	(2)
Vanadium	ug/l	4.9	N/A (3)	7.4	B	ug/l	7.4	Max	(1)	4.9	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: AOC 4 - ARC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Antimony	ug/l	16	N/A (3)	94		ug/l	92	95% UCL-T	(3)	6.2	Mean-T	(3)
Arsenic	ug/l	6.0	N/A (3)	18	NJ	ug/l	13	95% UCL-T	(3)	4.5	Mean-T	(3)
Cadmium	ug/l	3.2	N/A (3)	8.5	B	ug/l	8.5	Max	(1)	3.2	Mean-N	(2)
Copper	ug/l	266	N/A (3)	1230	EJ	ug/l	1230	Max	(1)	266	Mean-N	(2)
Manganese	ug/l	239	N/A (3)	730		ug/l	730	Max	(1)	239	Mean-N	(2)
Nickel	ug/l	37	N/A (3)	126	J	ug/l	126	Max	(1)	37	Mean-N	(2)
Silver	ug/l	11	N/A (3)	51		ug/l	36	95% UCL-T	(3)	6.7	Mean-T	(3)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: AOC 5 - DSM

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	ug/l	552	N/A (3)	569		ug/l	569	Max	(1)	552	Mean-N	(2)
Manganese	ug/l	1170	N/A (3)	1190	EJ	ug/l	1190	Max	(1)	1170	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: AOC 6 - RR

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aluminum	ug/l	956	N/A (3)	2310	J	ug/l	2310	Max	(1)	956	Mean-N	(2)
Antimony	ug/l	3.5	N/A (3)	5.7	B	ug/l	5.7	Max	(1)	3.5	Mean-N	(2)
Arsenic	ug/l	11	N/A (3)	20		ug/l	20	Max	(1)	11	Mean-N	(2)
Copper	ug/l	165	N/A (3)	249	EJ	ug/l	249	Max	(1)	165	Mean-N	(2)
Manganese	ug/l	87	N/A (3)	101	EJ	ug/l	101	Max	(1)	87	Mean-N	(2)
Thallium	ug/l	2.7	N/A (3)	5	B	ug/l	5	Max	(1)	2.7	Mean-N	(2)
Vanadium	ug/l	7.7	N/A (3)	18.6	B	ug/l	18.6	Max	(1)	7.7	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: AOC 1 - HRDD

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)anthracene	ug/kg	190	N/A (3)	61	J	ug/kg	61	Max	(1)	61	Max	(4)
Benzo(b)fluoranthene	ug/kg	183	N/A (3)	140	JX	ug/kg	140	Max	(1)	140	Max	(4)
Benzo(a)pyrene	ug/kg	173	N/A (3)	71	J	ug/kg	71	Max	(1)	71	Max	(4)
Indeno(1,2,3-cd)pyrene	ug/kg	214	N/A (3)	64	J	ug/kg	64	Max	(1)	64	Max	(4)
Aroclor-1254	ug/kg	103	N/A (3)	300	J	ug/kg	300	Max	(1)	103	Mean-N	(2)
Antimony	mg/kg	7.5	N/A (3)	21.4	BNJ	mg/kg	21.4	Max	(1)	7.5	Mean-N	(2)
Arsenic	mg/kg	309	N/A (3)	1110	NJ	mg/kg	1110	Max	(1)	309	Mean-N	(2)
Copper	mg/kg	1215	N/A (3)	5300		mg/kg	5300	Max	(1)	1215	Mean-N	(2)
Manganese	mg/kg	817	N/A (3)	2060		mg/kg	2060	Max	(1)	817	Mean-N	(2)
Thallium	mg/kg	1.2	N/A (3)	3.3	BJ	mg/kg	3.3	Max	(1)	3.2	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.
(4) Mean concentration exceeds the maximum concentration, due to high detection limits for nondetects.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: AOC 2 - ADC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)pyrene	ug/kg	1241	N/A (3)	10000	J	ug/kg	6002	95% UCL-T	(3)	395	Mean-T	(3)
Methoxychlor	ug/kg	56556	N/A (3)	640000	JD	ug/kg	640000	Max	(1)	56556	Mean-N	(2)
Arsenic	mg/kg	669	N/A (3)	3460	NJ	mg/kg	3460	Max	(1)	669	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: AOC 3 - SPD

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(b)fluoranthene	ug/kg	497	N/A (3)	910	JX	ug/kg	910	Max	(1)	497	Mean-N	(2)
Benzo(a)pyrene	ug/kg	350	N/A (3)	630	J	ug/kg	630	Max	(1)	350	Mean-N	(2)
Dibenzo(a,h)anthracene	ug/kg	240	N/A (3)	130	J	ug/kg	130	Max	(1)	130	Max	(2)
Arochlor 1254	ug/kg	953	N/A (3)	68	D	ug/kg	68	Max	(1)	66	Max	(2)
Heptachlor	ug/kg	79	N/A (3)	220	J	ug/kg	220	Max	(1)	79	Mean-N	(2)
Methoxychlor	ug/kg	56567	N/A (3)	130000	D	ug/kg	130000	Max	(1)	56537	Mean-N	(2)
Aluminum	mg/kg	9643	N/A (3)	13600	EJ	mg/kg	13600	Max	(1)	9643	Mean-N	(2)
Antimony	mg/kg	1.3	N/A (3)	2.3	BNJ	mg/kg	2.3	Max	(1)	1.3	Mean-N	(2)
Arsenic	mg/kg	13.7	N/A (3)	21.8		mg/kg	21.6	Max	(1)	13.7	Mean-N	(2)
Copper	mg/kg	334	N/A (3)	816		mg/kg	816	Max	(1)	334	Mean-N	(2)
Manganese	mg/kg	154	N/A (3)	262		mg/kg	282	Max	(1)	154	Mean-N	(2)
Vanadium	mg/kg	42	N/A (3)	47.9	B	mg/kg	47.9	Max	(1)	42	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.
(4) Mean concentration exceeds the maximum concentration, due to high detection limits for nondetects.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: AOC 4 - ARC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)pyrene	ug/kg	711	N/A (3)	1000		ug/kg	1000	Max	(1)	711	Mean-N	(2)
Dieldrin	ug/kg	20	N/A (3)	180	NJ	ug/kg	41	95% UCL-T	(3)	4.2	Mean-T	(3)
Aroclor-1246	ug/kg	303	N/A (3)	2100		ug/kg	2100	Max	(1)	303	Mean-N	(2)
Aroclor-1254	ug/kg	5003	N/A (3)	57500	D	ug/kg	57500	Max	(1)	5003	Mean-N	(2)
Aroclor-1260	ug/kg	254	N/A (3)	2100	JD	ug/kg	2100	Max	(1)	254	Mean-N	(2)
2,3,7,8-TCDD equiv.	ug/kg	0.04	N/A (3)	0.06	J	ug/kg	0.06	Max	(1)	0.04	Mean-N	(2)
Antimony	mg/kg	6.4	N/A (3)	26	NJ	mg/kg	26	Max	(1)	6.4	Mean-N	(2)
Arsenic	mg/kg	20	N/A (3)	49	N	mg/kg	49	Max	(1)	20	Mean-N	(2)
Copper	mg/kg	411	N/A (3)	2350		mg/kg	1493	95% UCL-T	(3)	202	Mean-T	(3)
Silver	mg/kg	52	N/A (3)	321		mg/kg	321	Max	(1)	52	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: AOC 5 - DSM

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)anthracene	ug/kg	450	N/A (3)	300	J	ug/kg	300	Max	(1)	300	Max	(4)
Benzo(b)fluoranthene	ug/kg	407	N/A (3)	730	JX	ug/kg	730	Max	(1)	407	Mean-N	(2)
Benzo(a)pyrene	ug/kg	460	N/A (3)	300	J	ug/kg	300	Max	(1)	300	Max	(4)
Indeno(1,2,3-cd)pyrene	ug/kg	437	N/A (3)	220	J	ug/kg	220	Max	(1)	220	Max	(4)
Aroclor-1254	ug/kg	367	N/A (3)	470	J	ug/kg	470	Max	(1)	367	Mean-N	(2)
Arsenic	mg/kg	1917	N/A (3)	4030	NJ	mg/kg	4030	Max	(1)	1917	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.
(4) Mean concentration exceeds the maximum concentration, due to high detection limits for nondetects.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: AOC 6 - RR

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Arsenic	mg/kg	460	N/A (3)	2200	J	mg/kg	2200	Max	(1)	450	Mean-N	(2)
Copper	mg/kg	1573	N/A (3)	3560	*J	mg/kg	3560	Max	(1)	1573	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Building Materials
Exposure Medium: Building Materials
Exposure Point: AOC 2 - ADC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Benzo(a)anthracene	ug/kg	466143	N/A (3)	1100000	EJ	ug/kg	1100000	Max	(1)	466143	Mean-N	(2)
Benzo(b)fluoranthene	ug/kg	540675	N/A (3)	1400000	E	ug/kg	1400000	Max	(1)	540875	Mean-N	(2)
Benzo(a)pyrene	ug/kg	426620	N/A (3)	1100000	E	ug/kg	1100000	Max	(1)	426620	Mean-N	(2)
Indeno(1,2,3-cd)pyrene	ug/kg	147910	N/A (3)	300000	J	ug/kg	300000	Max	(1)	147910	Mean-N	(2)
Dibenzo(a,h)anthracene	ug/kg	42436	N/A (3)	90000	J	ug/kg	90000	Max	(1)	42436	Mean-N	(2)
Naphthalene	ug/kg	100988	N/A (3)	320000		ug/kg	320000	Max	(1)	100988	Mean-N	(2)
2-Methylnaphthalene	ug/kg	496113	N/A (3)	1100000		ug/kg	1100000	Max	(1)	496113	Mean-N	(2)
Acenaphthene	ug/kg	355888	N/A (3)	800000	E	ug/kg	800000	Max	(1)	355888	Mean-N	(2)
Dibenzofuran	ug/kg	396113	N/A (3)	1000000	ED	ug/kg	1000000	Max	(1)	396113	Mean-N	(2)
Fluorene	ug/kg	563363	N/A (3)	1600000	E	ug/kg	1600000	Max	(1)	583363	Mean-N	(2)
Fluoranthene	ug/kg	1833536	N/A (3)	3900000	JD	ug/kg	3900000	Max	(1)	1833525	Mean-N	(2)
Pyrene	ug/kg	1411478	N/A (3)	2800000	JD	ug/kg	2800000	Max	(1)	1411478	Mean-N	(2)
Methoxychlor	ug/kg	37714	N/A (3)	150000	D	ug/kg	150000	Max	(1)	37714	Mean-N	(2)
Antimony	mg/kg	3.7	N/A (3)	5.7	BNJ	mg/kg	5.7	Max	(1)	3.7	Mean-N	(2)
Arsenic	mg/kg	46	N/A (3)	84	*EJ	mg/kg	84	Max	(1)	46	Mean-N	(2)
Copper	mg/kg	253	N/A (3)	495	*	mg/kg	495	Max	(1)	253	Mean-N	(2)
Manganese	mg/kg	239	N/A (3)	495		mg/kg	495	Max	(1)	239	Mean-N	(2)
Thallium	mg/kg	0.9	N/A (3)	1.8	B	mg/kg	1.8	Max	(1)	0.9	Mean-N	(2)
Zinc	mg/kg	961	N/A (3)	3050	*	mg/kg	3050	Max	(1)	961	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 1

MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Medium: Building Materials
Exposure Medium: Building Materials
Exposure Point: AOC 4 - ARC

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Normal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
Aroclor-1254	ug/kg	5599	N/A (3)	30000	JD	ug/kg	30000	Max	(1)	5599	Mean-N	(2)
2,3,7,8-TCDD equiv.	ug/kg	3.2	N/A (3)	17		ug/kg	17	Max	(1)	3.2	Mean-N	(2)
Antimony	mg/kg	9017	N/A (3)	31700	NJ	mg/kg	31700	Max	(1)	9017	Mean-N	(2)
Arsenic	mg/kg	155	N/A (3)	254	*EJ	mg/kg	254	Max	(1)	155	Mean-N	(2)

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

N/A - Not Applicable.
(1) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.
(2) 95% UCL exceeds maximum detected concentration. Therefore, arithmetic average concentration used for EPC.
(3) Data assumed to be log normally distributed.

Table 2

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Surface Soil	Atlantic Development Corp. Horseshoe Road Drum Dump Sayreville Pesticide Dump Atlantic Resources Corp.	Area Residents (Trespassers)	Youth	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	Quant Quant Qual**	The site is not currently used for industry. The facility has some minor institutional controls to prevent entry to the site, however entry has occurred as evidenced by vandalism.
				Residents	Adult & Child	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	At present, the site does not serve as a residential property.
				Site Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	The site's industrial operations have been abandoned. Therefore, there are no site workers currently at the site.
				Construction Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	Construction work involving excavation activity is not currently in progress at the site.

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Subsurface Soil	Atlantic Development Corp. Horseshoe Road Drum Dump Sayreville Pesticide Dump Atlantic Resources Corp.	Area Residents (Trespassers)	Youth	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	Construction work involving excavation activity is not currently in progress at the site. Therefore, no subsurface soil is accessible for contact.
				Residents	Adult & Child	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	Construction work involving excavation activity is not currently in progress at the site. Therefore, no subsurface soil is accessible for contact.
				Site Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	Construction work involving excavation activity is not currently in progress at the site. Therefore, no subsurface soil is accessible for contact.
				Construction Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	Construction work involving excavation activity is not currently in progress at the site. Therefore, no subsurface soil is accessible for contact.

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Building Materials	Building Materials	Atlantic Development Corp. Atlantic Resources Corp.	Area Residents (Trespassers)	Adult & Child	Ingestion Dermal Contact Inhalation of Particulates	On-Site	Quant Quant* Qual**	The site is not currently used for industry. The facility has some minor institutional controls to prevent entry to the site, However, entry has occurred as evidenced by vandalism.
				Residents	Adult & Child	Ingestion Dermal Contact Inhalation of Particulates	On-Site	None None None	At present, the site does not serve as a residential property.
				Site Workers	Adult	Ingestion Dermal Contact Inhalation of Particulates	On-Site	None None None	The site's industrial operations have been abandoned. Therefore, there are no site workers currently at the site.
				Construction Workers	Adult	Ingestion Dermal Contact Inhalation of Particulates	On-Site	None None None	Construction work involving excavation activity is not currently in progress at the site.

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Groundwater	Aquifer	Residents	Adult & Child	Ingestion	On-Site & Off-Site	None	At present, the site does not serve as a residential area. Groundwater from the site is not a potable source of drinking water for residents.
						Dermal Contact		None	
						Inhalation of VOCs		None	
				Site Workers	Adult	Ingestion	On-Site	None	The site's industrial operations have been abandoned. Therefore, there are no site workers currently at the site.
						Dermal Contact		None	
						Inhalation of VOCs		None	
				Construction Workers	Adult	Ingestion	On-Site	None	Construction work is not currently in progress at the site.
						Dermal Contact		None	
						Inhalation of VOCs		None	

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Surface Water	Surface Water	Raritan River Drafting Pond Drainage Channels Wetlands	Area Residents (Trespassers)	Youth	Ingestion Dermal Contact Inhalation of VOCs	On-Site	Quant Quant Qual**	Trespassers may incidently ingest and dermally contact surface water in the Raritan River, drafting pond, drainage channels and wetlands. Exposure to VOCs released from surface water into ambient air will be qualitatively evaluated.
Current	Surface Water	Shellfish	Raritan River	Residents	Adult	Ingestion	On-site	Quant	Residents may ingest shellfish caught in the Raritan River that have been potentially impacted by site contaminants released into surface water.
Current	Sediment	Sediment	Raritan River Drafting Pond Drainage Channels Wetlands	Area Residents (Trespassers)	Youth	Ingestion Dermal Contact Inhalation of Particulates	On-Site	Quant Quant* Qual**	Trespassers may incidently ingest and dermally contact surface water in the Raritan River, drafting pond, drainage channels and wetlands. Exposure to particulates released from sediment into ambient air will be qualitatively evaluated.

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil	Surface Soil	Atlantic Development Corp. Horseshoe Road Drum Dump Sayreville Pesticide Dump Atlantic Resources Corp.	Area Residents (Trespassers)	Youth	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	Quant Quant* Qual**	The site may be redeveloped for commercial/industrial uses. Trespassing by area residents may occur.
				Residents	Adult & Child	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	The site will remain as commercial/industrial in the future.
				Site Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	Quant Quant* Qual**	The site may be redeveloped for commercial/industrial uses and workers may conduct activities in outside areas.
				Construction Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	Quant Quant* Qual**	Future construction activities may occur on the site. Potential exposures are expected to be short-term (i.e., six months)

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Soil	Subsurface Soil	Atlantic Development Corp. Horseshoe Road Drum Dump Sayreville Pesticide Dump Atlantic Resources Corp.	Area Residents (Trespassers)	Youth	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	Quant Quant* Qual**	The site may be redeveloped for commercial/industrial uses. Trespassing by area residents may occur. Exposure to subsurface soils may occur, if excavation activities are conducted.
				Residents	Adult & Child	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	The site will remain as commercial/industrial in the future.
				Site Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	Quant Quant* Qual**	The site may be redeveloped for commercial/industrial uses and workers may be exposed to subsurface soils if excavation activities are conducted.
				Construction Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	Quant Quant* Qual**	Future construction activities may occur on the site. Potential exposures to construction workers are expected to be short-term (i.e. six months)

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Building Materials	Building Materials	Atlantic Development Corp. Atlantic Resources Corp.	Area Residents (Trespassers)	Youth	Ingestion Dermal Contact Inhalation of Particulates	On-Site	Quant Quant* Qual**	The site may be redeveloped for commercial/industrial uses. Trespassing by area residents may occur.
				Residents	Adult & Child	Ingestion Dermal Contact Inhalation of Particulates	On-Site	None None None	The site may be theoretically developed for residential purposes. However, it is assumed that the present buildings would not be used as residences.
				Site Workers	Adult	Ingestion Dermal Contact Inhalation of Particulates	On-Site	Quant Quant* Qual**	The site may be redeveloped for commercial/industrial uses and workers may be exposed to building materials, if the present buildings are used.
				Construction Workers	Adult	Ingestion Dermal Contact Inhalation of Particulates	On-Site	Quant Quant* Qual**	Construction work inside the present site buildings may occur.

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Aquifer	Residents	Adult & Child	Ingestion Dermal Contact Inhalation of VOCs	On-Site & Off-Site	None None None	If the site is residentially developed in the future, it is not likely that water supply wells will be installed in the site's aquifer, since there is not sufficient yield in the aquifer to support a well.
				Site Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs	On-Site	None None None	If the site is commercially/industrially developed in the future, it is not likely water supply wells will be installed in the site's aquifer, since there is not sufficient yield in the aquifer to support a well.
				Construction Workers	Adult	Ingestion Dermal Contact Inhalation of VOCs and Particulates	On-Site	None None None	If the site is commercially/industrially developed in the future, It is not likely water supply wells will be installed in the site's aquifer, since there is not sufficient yield in the aquifer to support a well.

Table 2

SELECTION OF EXPOSURE PATHWAYS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Surface Water	Surface Water	Raritan River Drafting Pond Drainage Channels Wetlands	Area Residents (Trespassers)	Youth	Ingestion Dermal Contact Inhalation of VOCs	On-Site	Quant Quant Qual**	Trespassers may incidentally ingest and dermally contact surface water in the Raritan River, drafting pond, drainage channels and wetlands. Exposure to VOCs released from surface water into ambient air will be qualitatively evaluated.
			Raritan River Wetlands	Residents	Adult & Child	Ingestion Dermal Contact Inhalation of VOCs	On-Site	Quant Quant Qual**	It is possible that the areas along the Raritan River will be developed into a public area, including a boardwalk, park, and retail shops. Exposure to VOCs released from surface water into ambient air will be qualitatively evaluated.
Future	Surface Water	Shellfish	Raritan River	Residents	Adult	Ingestion	Off-Site	Quant	Residents may ingest shellfish caught in the Raritan River that have been potentially impacted by site contaminants released into surface water.
Future	Sediment	Sediment	Raritan River Drafting Pond Drainage Channels Wetlands	Area Residents (Trespassers)	Youth	Ingestion Dermal Contact Inhalation of Particulates	On-Site	Quant Quant* Qual**	Trespassers may incidentally ingest and dermally contact sediment in the Raritan River, drafting pond, drainage channels and wetlands. Exposure to particulates released from sediment into ambient air will be qualitatively evaluated.
			Raritan River Wetlands	Residents	Adult & Child	Ingestion Dermal Contact Inhalation of Particulates	On-Site	Quant Quant* Qual**	It is possible that the areas along the Raritan River will be developed into a public area, including a boardwalk, park, and retail shops. Exposure to particulates released from sediment into ambient air will be qualitatively evaluated.

* The dermal contact pathway for soil and sediment at the site can only be quantitatively evaluated for arsenic, cadmium, chlordane, DDT, TCDD (dioxin), PAHs (benzo(a)pyrene, PCBs (Aroclor 1254 and 1242), pentachlorophenol, generic default SVOCs, and inorganics. Region II currently provided dermal absorption factors for these chemicals. All other chemicals will be qualitatively discussed.

** The inhalation of VOCs and particulates pathways were eliminated from the risk assessment based on the results of the chemical concentration-toxicity screens performed for site media in the various areas of concern and the chemicals of potential concern selected. The majority of COCs were nonvolatiles (PAHs, pesticides, PCBs, and inorganics).

Table 3

Table 3

NON-CANCER CHRONIC TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)
Volatile Organics							
Acetone	Chronic	1.0E-001	mg/kg/day	Liver/Kidney	1000	IRIS (1)	11/09/98
Benzene	Chronic	3.0E-003	mg/kg/day	-	-	NCEA (3)	10/01/98
Bromodichloromethane	Chronic	2.0E-002	mg/kg/day	Kidney	1000	IRIS	11/09/98
Bromomethane	Chronic	1.4E-003	mg/kg/day	Forestomach	1000	IRIS	11/09/98
2-Butanone	Chronic	6.0E-001	mg/kg/day	Fetus	3000	IRIS	11/09/98
Carbon Disulfide	Chronic	1.0E-001	mg/kg/day	Fetus	100	IRIS	11/09/98
Carbon Tetrachloride	Chronic	7.0E-004	mg/kg/day	Liver	1000	IRIS	11/09/98
Chlorobenzene	Chronic	2.0E-002	mg/kg/day	Liver	1000	IRIS	11/09/98
Chloroethane	Chronic	4.0E-001	mg/kg/day	-	-	NCEA	10/01/98
Chloroform	Chronic	1.0E-002	mg/kg/day	Liver	1000	IRIS	11/09/98
Chloromethene	Chronic	-	mg/kg/day	-	-	-	-
1,1-Dichlor0ethane	Chronic	1.0E-001	mg/kg/day	None	1000	HEAST (2)	1997
1,2-Dichloroethane	Chronic	3.0E-002	mg/kg/day	-	-	NCEA	10/01/98
1,1-Dichloroethane	Chronic	9.0E-003	mg/kg/day	Liver	1000	IRIS	11/09/98
cis 1,2-Dichloroethene	Chronic	1.0E-002	mg/kg/day	Blood	3000	HEAST	1997
trans 1,2-Dichloroethene	Chronic	2.0E-002	mg/kg/day	Blood	1000	IRIS	11/09/98
total 1,2-Dichloroethene	Chronic	9.0E-003	mg/kg/day	Liver	1000	IRIS	11/09/98
1,2-Dichlorpropane	Chronic	-	mg/kg/day	-	-	-	-
trans-1,3-Dichloropropene	Chronic	3.0E-004	mg/kg/day	Organ weights	10000	IRIS	11/09/98
Ethylbenzene	Chronic	1.0E-001	mg/kg/day	Liver/Kidney	1000	IRIS	11/09/98
Methylene Chloride	Chronic	6.0E-002	mg/kg/day	Liver	100	IRIS	11/09/98
4-Methyl-2-Pentanone	Chronic	8.0E-002	mg/kg/day	Whole Body/Liver	3000	HEAST	1997
Styrene	Chronic	2.0E-001	mg/kg/day	Blood/Liver	1000	IRIS	11/09/98
Tetrachloroethene	Chronic	1.0E-002	mg/kg/day	Liver	1000	IRIS	11/09/98
1,1,2,2-Tetrachloroethane	Chronic	6.0E-002	mg/kg/day	-	-	NCEA	10/01/98
Toluene	Chronic	2.0E-001	mg/kg/day	Liver/Kidney	1000	IRIS	11/09/98
1,1,1-Trichoroethene	Chronic	2.0E-002	mg/kg/day		3000	NCEA	10/01/98
1,1,2-Trichloroethene	Chronic	4.0E-003	mg/kg/day	Blood	1000	IRIS	11/09/98
Trichloroethene	Chronic	6.0E-003	mg/kg/day		3000	NCEA	10/01/98
Vinyl Chloride	Chronic	-	mg/kg/day	-	-	-	-
Xylenes(Total)	Chronic	2.0E+000	mg/kg/day	CNS/Whole Body	100	IRIS	11/09/98

Table 3

NON-CANCER CHRONIC TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)
Semivolatile Organics							
Acenaphthene	Chronic	6.0E-002	mg/kg/day	Liver	3000	IRIS	11/09/98
Acenaphthylene	Chronic	-	mg/kg/day	-	-	-	-
Anthracene	Chronic	3.0E-001	mg/kg/day	None	3000	IRIS	11/09/98
Benzo(a)anthracene	Chronic	-	mg/kg/day	-	-	-	-
Benzo(a)pyrene	Chronic	-	mg/kg/day	-	-	-	-
Benzo(b)fluoranthene	Chronic	-	mg/kg/day	-	-	-	-
Benzo(g,h,i)perylene	Chronic	-	mg/kg/day	-	-	-	-
Benzo(k)fluoranthene	Chronic	-	mg/kg/day	-	-	-	-
Bis(2-chloroethyl)ether	Chronic	-	mg/kg/day	-	-	-	-
Bis(2-ethylhexyl)phthalate	Chronic	2.0E-002	mg/kg/day	Liver	1000	IRIS	11/09/98
Butylbenzyl phthalate	Chronic	2.0E-001	mg/kg/day	Liver	1000	IRIS	11/09/98
Carbazole	Chronic	-	mg/kg/day	-	-	-	-
4-Chloroaniline	Chronic	4.0E-003	mg/kg/day	Spleen	3000	IRIS	11/09/98
2-Chloronaphthalene	Chronic	8.0E-002	mg/kg/day				
Chrysene	Chronic	-	mg/kg/day	-	-	-	-
Dibenzo(a,h)anthracene	Chronic	-	mg/kg/day	-	-	-	-
Dibenzofuran	Chronic	4.0E-003	mg/kg/day	-	-	NCEA	10/01/98
Di-n-butyl phthalate	Chronic	1.0E-001	mg/kg/day	Whole Body	1000	IRIS	11/09/98
1,2-Dichlorobenzene	Chronic	9.0E-002	mg/kg/day	None	1000	IRIS	11/09/98
1,3-Dichlorobenzene	Chronic	3.0E-002	mg/kg/day	-	-	NCEA	10/01/98
1,4-Dichlorobenene	Chronic	3.0E-002	mg/kg/day	-	-	NCEA	10/01/98
2,4-Dichlorophenol	Chronic	3.0E-003	mg/kg/day	Hypersensitivity	100	IRIS	11/09/98
Diethyl phthalate	Chronic	8.0E-001	mg/kg/day	Whole Body/Organs	1000	IRIS	11/09/98
2,4-Dimethylphenol	Chronic	2.0E-002	mg/kg/day	Clinical signs/Blood	3000	IRIS	11/09/98
2,4-Dinitrotoluene	Chronic	2.0E-003	mg/kg/day	Nervous system	100	IRIS	11/09/98
Di-n-octyl phthalate	Chronic	2.0E-002	mg/kg/day	Kidney/Liver	1000	HEAST	1997

Table 3

NON-CANCER CHRONIC TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)
Semivolatile Organics (Cont'd)							
Fluoranthene	Chronic	4.0E-002	mg/kg/day	Kidney/Liver/Blood	3000	IRIS	11/09/98
Fluorene	Chronic	4.0E-002	mg/kg/day	Blood	3000	IRIS	11/09/98
Hexachlorobutadiene	Chronic	2.0E-004	mg/kg/day	Kidney	1000	HEAST	1997
Hexachlorocyclopentadiene	Chronic	7.0E-003	mg/kg/day	Stomach	1000	IRIS	11/09/98
Hexachloroethane	Chronic	1.0E-003	mg/kg/day	Kidney	1000	IRIS	11/09/98
Indeno(1,2,3-cd)pyrene	Chronic	-	mg/kg/day	-	-	-	-
Isophorone	Chronic	2.0E-001	mg/kg/day	Kidney	1000	IRIS	11/09/98
2-Methylnaphthalene	Chronic	2.0E-002	mg/kg/day	-	-	RBC (7)	10/01/98
2-Methylphenol	Chronic	5.0E-002	mg/kg/day	Whole Body/CNS	1000	IRIS	11/09/98
4-Methylphenol	Chronic	5.0E-003	mg/kg/day	CNS/Respiratory	1000	HEAST	1997
Naphthalene	Chronic	2.0E-002	mg/kg/day	Whole Body	1000	NCEA	10/01/98
Nitrobenzene	Chronic	5.0E-004	mg/kg/day	Blood/Adrenal	10000	IRIS	11/09/98
n-Nitrosodiphenylamine	Chronic	-	mg/kg/day	-	-	-	-
2-Nitrophenol	Chronic	-	mg/kg/day	-	-	-	-
4-Nitrophenol	Chronic	8.0E-003	mg/kg/day	-	-	NCEA	10/01/98
Pentachlorophenol	Chronic	3.0E-002	mg/kg/day	Liver/Kidney	100	IRIS	11/09/98
Phenanthrene	Chronic	-	mg/kg/day	-	-	-	-
Phenol	Chronic	6.0E-001	mg/kg/day	Fetus	100	IRIS	11/09/98
Pyrene	Chronic	3.0E-002	mg/kg/day	Kidney	3000	IRIS	11/09/98
1,2,3-Trichlorobenzene	Chronic	-	mg/kg/day	-	-	-	-
1,2,4-Trichlorobenzene	Chronic	1.0E-002	mg/kg/day	Adrenal	1000	IRIS	11/09/98
2,4,6-Trichlorophenol	Chronic	-	mg/kg/day	-	-	-	-
2,4,5-Trichlorophenol	Chronic	1.0E-001	mg/kg/day	Liver/Kidney	1000	IRIS	11/09/98

Table 3

NON-CANCER CHRONIC TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)
Pesticides/PCBs							
Aldrin	Chronic	3.0E-005	mg/kg/day	Liver	1000	IRIS	11/09/98
4,4'-DDD	Chronic	-	mg/kg/day	-	-	-	-
4,4'-DDE	Chronic	-	mg/kg/day	-	-	-	-
4,4'-DDT	Chronic	5.0E-004	mg/kg/day	Liver	100	IRIS	11/09/98
alpha-BHC	Chronic	-	mg/kg/day	-	-	-	-
beta-BHC	Chronic	-	mg/kg/day	-	-	-	-
delta-BHC	Chronic	-	mg/kg/day	-	-	-	-
gamma-BHC (Lindane)	Chronic	3.0E-004	mg/kg/day	Liver/Kidney	1000	IRIS	11/09/98
alpha-Chlordane	Chronic	5.0E-004	mg/kg/day	Liver	300	IRIS (4)	11/09/98
gamma-Chlordane	Chronic	5.0E-004	mg/kg/day	Liver	300	IRIS (4)	11/09/98
Dieldrin	Chronic	5.0E-004	mg/kg/day	Liver	100	IRIS	11/09/98
Endosulfan I	Chronic	6.0E-003	mg/kg/day	Whole Body/Kidney	100	IRIS (5)	11/09/98
Endosulfan II	Chronic	6.0E-003	mg/kg/day	Whole Body/Kidney	100	IRIS (5)	11/09/98
Endrin	Chronic	3.0E-004	mg/kg/day	CNS/Liver	100	IRIS	11/09/98
Endrin Aldehyde	Chronic	-	mg/kg/day	-	-	-	-
Endrin Ketone	Chronic	-	mg/kg/day	-	-	-	-
Heptachlor	Chronic	5.0E-004	mg/kg/day	Liver	300	IRIS	11/09/98
Heptachlor Epoxide	Chronic	1.3E-005	mg/kg/day	Liver	1000	IRIS	11/09/98
Methoxychlor	Chronic	5.0E-003	mg/kg/day	Reproductive	1000	IRIS	11/09/98
PCBs Aroclor 1242	Chronic	-	mg/kg/day	-	-	-	-
Aroclor 1248	Chronic	-	mg/kg/day	-	-	-	-
Aroclor 1254	Chronic	2.0E-005	mg/kg/day	Immune System	300	IRIS	11/09/98
Aroclor 1260	Chronic	-	mg/kg/day	-	-	-	-
Dioxins							
2,3,7,8-TCDD	Chronic	-	mg/kg/day	-	-	-	-

Table 3

NON-CANCER CHRONIC TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (MM/DD/YY)
Inorganics							
Aluminum	Chronic	1.0E+000	mg/kg/day	-	100	NCEA	10/01/98
Antimony	Chronic	4.0E-004	mg/kg/day	Whole Body/Blood	1000	IRIS	11/09/98
Arsenic	Chronic	3.0E-004	mg/kg/day	Skin	3	IRIS	11/09/98
Barium	Chronic	7.0E-002	mg/kg/day	Cardiovascular	3	IRIS	11/09/98
Beryllium	Chronic	2.0E-003	mg/kg/day	Small Intestine	300	IRIS	11/09/98
Cadmium (food)	Chronic	1.0E-003	mg/kg/day	Kidney	10	IRIS	11/09/98
Cadmium (water)	Chronic	5.0E-004	mg/kg/day	Kidney	10	IRIS	11/09/98
Chromium III (insoluble salts)	Chronic	1.5E+000	mg/kg/day	None	100	IRIS	11/09/98
Chromium VI	Chronic	3.0E-003	mg/kg/day	None	300	IRIS	11/09/98
Cobalt	Chronic	6.0E-002	mg/kg/day	-	-	NCEA	10/01/98
Copper	Chronic	4.0E-002	mg/kg/day	-	-	NCEA	10/01/98
Cyanide (free)	Chronic	2.0E-002	mg/kg/day	Weight loss/thyroid	500	IRIS	11/09/98
Lead (and compounds-Inorg.)**	Chronic	-	mg/kg/day	-	-	-	-
Manganese	Chronic	2.4E-002	mg/kg/day		3	NCEA	10/01/98
Mercury (elemental)	Chronic	-	mg/kg/day	-	-	-	-
Nickel (soluble salt)	Chronic	2.0E-002	mg/kg/day	Whole Body Organs	300	IRIS	11/09/98
Selenium	Chronic	5.0E-003	mg/kg/day	Whole Body	3	IRIS	11/09/98
Silver	Chronic	5.0E-003	mg/kg/day	Skin	3	IRIS	11/09/98
Thallium	Chronic	7.0E-005	mg/kg/day	Liver/blood/hair	-	RBC	10/01/98
Vanadium	Chronic	7.0E-003	mg/kg/day	None	100	HEAST	1997
Zinc (and compounds)	Chronic	3.0E-001	mg/kg/day	Blood	3	IRIS	11/09/98

Notes:
- Calcium, Iron, magnesium, potassium, and sodium are considered essential nutrients and will not be quantitatively evaluated in the risk assessment.
* - A modifying factor of 3 was used to address the lack of unequivocal data for respiratory tract effects.
** - Since no noncarcinogenic toxicity values are currently established for lead, only a qualitative evaluation of this chemical can be performed. The USEPA's Revised Interim Soil Guidance for CERLCA Sites and RCRA Corrective Action Facilities, OSWER Directive 9355.4-12, recommends screening levels for soil of 400 ppm for residential land use (USEPA, 1994). New Jersey's Drinking Water and Ground Water Update recommends an action level for lead in drinking water of 15 ug/l (USEPA, 1993)
(1) All toxicity values were obtained from integrated Risk Information System (IRIS) (on-line November 1998) unless otherwise noted.
(2) Toxicity values were obtained from Health Effects Assessment Summary Tables (HEAST) Annual FY-1997.
(3) Toxicity values were obtained by the national Center for Environmental Assessment (NCEA). EPA Region III Risk-based Concentration (RBC) Table 10/01/98.
(4) The noncarcinogenic toxicity values for technical chlordane are reported from IRIS, as the individual alpha and gamma-chlordane isomers do not have established noncarcinogenic toxicity values.
(5) The noncarcinogenic toxicity values for endosulfan are reported from IRIS, as the individual endosufan I and endosulfan II do not have established noncarcinogenic toxicity values.
(6) The total intake of manganese is estimated to be 10 mg/day. Of the 10 mg/day, 5 mg/day is subtracted as the estimated daily dietary intake. The remaining value, 5 mg/day, was then divided by 70 kg (adult body weight) and by a modifying factor of 3 (sensitive individuals).
(7) Toxicity values were obtained from EPA, Region III, Risk-based Concentration (RBC), 10/1/98.

Table 3

NON-CANCER TOXICITY DATA – INHALATION
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates of (2) (MM/DD/YY)
N/A - Not Applicable. No Chemicals of Potential Concern evaluated for inhalation exposures.									

N/A = Not applicable

(1) Provide equation used for derivation in text.

(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.

Table 3

NON-CANCER CHRONIC TOXICITY DATA – SPECIAL CASE CHEMICALS
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Value	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of Primary Target Organ	Date (MM/DD/YY)
N/A - Not Applicable. No Special Case Chemicals evaluated.							

Table 4

Table 4

CANCER TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Volatile Organics					
Acetone	-	-	D	-	-
Benzene	2.9E-002	(mg/kg/day)-1	A	IRIS	11/09/98
Bromodichlormethane	6.2E-002	(mg/kg/day)-1	B2	IRIS	11/09/98
Bromomethane	-	-	D	-	-
2-Butanone	-	-	D	-	-
Carbon Disulfide	-	-	-	-	-
Carbon Tetrachloride	1.3E-001	(mg/kg/day)-1	B2	IRIS	11/09/98
Chlorobenzene	-	-	D	-	-
Chloroethane	2.9E-003	(mg/kg/day)-1	-	NCEA	10/01/98
Chloroform	6.1E-003	(mg/kg/day)-1	B2	IRIS	11/09/98
Chloromethane	1.3E-002	(mg/kg/day)-1	C	HEAST	1997
1,1-Dichloroethane	-	-	C	-	-
1,2-Dichloroethene	9.1E-002	(mg/kg/day)-1	B2	IRIS	11/09/98
1,1-Dichloroethene	6.0E-001	(mg/kg/day)-1	C	IRIS	11/09/98
cis 1,2-Dichloroethene	-	-	D	-	-
trans 1,2-Dichloroethene	-	-	-	-	-
total 1,2-Dichloroethene	-	-	D	-	-
1,2-Dichloropropane	6.8E-002	(mg/kg/day)-1	B2	HEAST	1997
trans 1,3-Dichloropropene	1.8E-001	(mg/kg/day)-1	B2	IRIS	11/09/98
Ethylbenzene	-	-	D	-	-
Methylene Chloride	7.5E-003	(mg/kg/day)-1	B2	IRIS	11/09/98
4-Methyl-2-Pentanone	-	-	-	-	-
Styrene	-	-	-	-	-
Tetrachloroethene	5.2E-002	(mg/kg/day)-1	B2-C	NCEA	10/01/98
1,1,2,2-Tetrachloroethene	2.0E-001	(mg/kg/day)-1	C	IRIS	11/09/98
Toluene	-	-	D	-	-
1,1,1-Trichloroethane	-	-	D	-	-
1,1,2-Trichloroethane	5.7E-002	(mg/kg/day)-1	C	IRIS	11/09/98
Trichloroethene	1.1E-002	(mg/kg/day)-1	B2-C	NCEA	10/01/98
Vinyl Chloride	1.9E+000	(mg/kg/day)-1	A	HEAST	1997
Xylenes (Total)	-	-	D	-	-

Table 4

CANCER TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Semivolatile Organics					
Acenaphthene	-	-	-	-	-
Acenaphthylene	-	-	D	-	-
Anthracene	-	-	D	-	-
Benzo(a)anthracene	7.3E-001	(mg/kg/day)-1	B2	IRIS*	11/09/98
Benzo(a)pyrene	7.3E+000	(mg/kg/day)-1	B2	IRIS	11/09/98
Benzo(b)fluoranthene	7.3E-001	(mg/kg/day)-1	B2	IRIS*	11/09/98
Benzo(g,h)perylene	-	-	D	-	-
Benzo(k)fluoranthene	7.3E-002	(mg/kg/day)-1	B2	IRIS*	11/09/98
Bis(2-chloroethyl)ether	1.1E+000	(mg/kg/day)-1	B2	IRIS	11/09/98
Bis(2-ethylhexyl)phthalate	1.4E-002	(mg/kg/day)-1	B2	IRIS	11/09/98
Butylbenzyl phthalate	-	-	C	-	-
Carbazole	2.0E-002	(mg/kg/day)-1	B2	HEAST	1997
4-Chloroaniline	-	-	-	-	-
2-Chloronaphthalene	-	-	-	-	-
Chrysene	7.3E-003	(mg/kg/day)-1	B2	IRIS*	11/09/98
Dibenzo(a,h)anthracene	7.3E+000	(mg/kg/day)-1	B2	IRIS	11/09/98
Dibenzofuran	-	-	D	-	-
Di-n-butyl phthalate	-	-	D	-	-
1,2-Dichlorobenzene	-	-	D	-	-
1,3-Dichlorobenzene	-	-	D	-	-
1,4-Dichlorobenzene	2.4E-002	(mg/kg/day)-1	C	HEAST	1997
2,4-Dichlorophenol	-	-		-	-
Diethyl phthalate	-	-	D	-	-
2,4-Dimethylphenol	-	-	-	-	-
2,4-Dinitrotoluene	-	-	-	-	-
di-n-octyl phthalate	-	-	D	-	-

Table 4

CANCER TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Semivolatile Organics (Cont'd)					
Fluoranthene	-	-	D	-	-
Fluorene	-	-	D	-	-
Hexachlorobutadiene	7.8E-002	(mg/kg/day)-1	C	IRIS	11/09/98
Hexachlorocyclopentadiene	-	-	D	-	-
Hexachloroethene	1.4E-002	(mg/kg/day)-1	C	IRIS	11/09/98
Indeno(1,2,3-cd)pyrene	7.3E-001	(mg/kg/day)-1	B2	IRIS*	11/09/98
Isophorone	9.5E-004	(mg/kg/day)-1	C	IRIS	11/09/98
2-Methylnaphthelene	-	-	-	-	-
2-Methylphenol	-	-	C	-	-
4-Methylphenol	-	-	C	-	-
Naphthalene	-	-	D	-	-
Nitrobenzene	-	-	D	-	-
n-Nitroeodiphenylamine	4.9E-003	(mg/kg/day)-1	B2	IRIS	11/09/98
2-Nitrophenol	-	-	D	-	-
4-Nitrophenol	-	-	-	-	-
Pentachlorophenol	1.2E-001	(mg/kg/day)-1	B2	IRIS	11/09/98
Phenenthrene	-	-	D	-	-
Phenol	-	-	D	-	-
Pyrene	-	-	D	-	-
1,2,3-Trichlorobenzene	-	-	D	-	-
1,2,4-Trichlorobenzene	-	-	D	-	-
2,4,6-Trichlorophenol	1.1E-002	(mg/kg/day)-1	B2	IRIS	11/09/98
2,4,5-Trichlorophenol	-	-	-	-	-

Table 4

CANCER TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Pesticides/PCBs					
Aldrin	1.7E+001	(mg/kg/day)-1	B2	IRIS	11/09/98
4,4'-DDD	2.4E-001	(mg/kg/day)-1	B2	IRIS	11/09/98
4,4'-DDE	3.4E-001	(mg/kg/day)-1	B2	IRIS	11/09/98
4,4'DDT	3.4E-001	(mg/kg/day)-1	B2	IRIS	11/09/98
alpha-BHC	6.3E+000	(mg/kg/day)-1	B2	IRIS	11/09/98
beta-BHC	1.8E+000	(mg/kg/day)-1	C	IRIS	02/15/98
delta-BHC	-	-	C	-	-
gamma-BHC (Lindane)	1.3E+000	(mg/kg/day)-1	B2-C	HEAST	1997
alaph-Chlordane	3.5E-001	(mg/kg/day)-1	B2	IRIS ((4)	11/09/98
gamma-Chlordane	3.5E-001	(mg/kg/day)-1	B2	IRIS ((4)	11/09/98
Dieldrin	1.6E+001	(mg/kg/day)-1	B2	IRIS	11/09/98
Endosulfan I	-	-	-	(5)	-
Endosulfan II	-	-	-	(5)	-
Endrin	-	-	D	-	-
Endrin Aldehyde	-	-	-	-	-
Endrin Ketone	-	-	-	-	-
Heptachlor	4.5E+000	(mg/kg/day)-1	B2	IRIS	11/09/98
Heptachlor Epoxide	9.1E+000	(mg/kg/day)-1	B2	IRIS	11/09/98
Methyoxychlor	-	-	D	-	-
PCBs: Aroclor 1242	2.0E+00 (soil/food); 4.0E-01 (water)	(mg/kg/day)-1	B2	IRIS	11/09/98
Aroclor 1248	2.0E+00 (soil/food); 4.0E-01 (water)	(mg/kg/day)-1	B2	IRIS	11/09/98
Aroclor 1254	2.0E+00 (soil/food); 4.0E-01 (water)	(mg/kg/day)-1	B2	IRIS	11/09/98
Aroclor 1260	2.0E+00 (soil/food); 4.0E-01 (water)	(mg/kg/day)-1	B2	IRIS	11/09/98
Dioxin					
2,3,7,8-TCDD	1.5E+005	(mg/kg/day)-1	B2	HEAST	1997

Table 4

CANCER TOXICITY DATA – ORAL
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (MM/DD/YY)
Inorganics					
Aluminum	-	-	-	-	-
Antimony	-	-	-	-	-
Arsenic	1.5E+000	mg/kg/day)-1	A	IRIS	11/09/98
Barium	-	-	-	-	-
Beryllium	-	-	B1	IRIS	11/09/98
Cadmium	-	-	B1	-	-
Chromium III (insolublesalts)	-	-	D	-	-
Chromium VI	-	-	A	-	-
Cobalt	-	-	-	-	-
Copper	-	-	D	-	-
Cyanide	-	-	D	-	-
Lead (and compounds-Inorg.)**	-	-	B2	-	-
Manganese	-	-	D	-	-
Mercury	-	-	D	-	-
Nickel (soluble salt)	-	-	-	-	-
Selenium (and compounds)	-	-	D	-	-
Silver	-	-	D	-	-
Thallium	-	-	D	-	-
Vanadium	-	-	D	-	-
Zinc (and compounds)	-	-	D	-	-

Table 4

Notes:

- Calcium, Iron, magnesium, potassium, and sodium are considered essential nutrients and will not be quantitatively evaluated in the risk assessment.

* Relative potency values were used in conjunction with the benzo(a)pyrene oral slope factor per USEPA Guidance (July) (USEPA, 1993a).

** Since no carcinogenic toxicity values are currently established for lead, only a qualitative evaluation of this chemical can be performed. The USEPA's Revised Interim Soil Guidance for CERCLA Sites and RCRA Corrective Action Facilities, OSWER Directive 9355.4-12, recommends screening levels for soil of 400 ppm residential land use (USEPA, 1994). New Jersey's Drinking Water and Ground Water Update recommends an action level for lead in drinking water of 15 ug/l (USEPA, 1993).

(1) All toxicity values were obtained form IRIS (on-line November 9, 1998) unless otherwise noted.

(2) Toxicity values were obtained from HEAST Annual FY-1997.

(3) Toxicity values were obtained from the National Center for Environmental Assessment. EPA Region III Risk-based Concentration (RBC) Table 10/1/98.

(4) The carcinogenic toxicity values for technical chlordane are reported, as the individual alpha and gamma-chlordane isomers do not have established carcinogenic toxicity levels.

(5) No carcinogenic toxicity values are currently established for endosulfan or its isomers endosulfan I and endosulfan II.

EPA Group:

- A - Human carcinogen
- B1 - Probable human carcinogen - indicates that limited human data are available
- B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
- C - Possible human carcinogen
- D - Not classifiable as a human carcinogen
- E - Evidence of noncarcinogenicity

Weight of Evidence:

- Known/Likely
- Cannot be Determined
- Not Likely

Table 4

CANCER TOXICITY DATA – INHALATION
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE NEW JERSEY

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (1) (MM/DD/YY)
N/A - Not Applicable. No Chemicals of Potential Concern evaluated for inhalation exposures.								

IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables

Weight of Evidence:
- Known/Likely
- Cannot be Determined
- Not Likely

(1) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

Table 4

CANCER TOXICITY DATA – SPECIAL CASE CHEMICALS

HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Chemical of Potential Concern	Value	Units	Source	Date (1) MM/DD/YY
N/A - Not Applicable. No Special Case Chemicals evaluated.				

(1) For IRIS values, provide the date IRIS were searched.
For HEAST values, provide the date of HEAST.
For NCEA values, provide the date of the article provided by NCEA.

Table 5

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Receptor Population: Area Residents (Trespassers
Receptor Age: Youth (12-17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 2 - ADC	Arsenic	1.2E-006	--	9.5E-008	2.2E-006	Arsenic	Skin	7.3E-001	--	6.5E-001	1.3E+000
			(Total)	1.2E-006	--	9.5E-008	2.2E-006	(Total)		7.3E-001	--	6.5E-001	1.3E+000
Building Materials	Building Materials	AOC 2 - ADC	Benzo(a)anthracene	4.1E-006	--	1.4E-005	1.8E-005	Benzo(a)anthracene	--	--	--	--	--
			Benzo(b)fluoranthene	5.2E-006	--	1.7E-005	2.2E-005	Benzo(b)fluoranthene	--	--	--	--	--
			Benzo(a)pyrene	4.1E-006	--	1.4E-004	1.8E-004	Benzo(a)pyrene	--	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.1E-006	--	3.7E-006	4.8E-006	Indeno(1,2,3-cd)pyrene	--	--	--	--	--
			Dibenzo(a,h)anthracene	3.4E-006	--	1.1E-005	1.4E-005	Dibenzo(a,h)anthracene	--	--	--	--	--
			Arsenic	6.4E-007	--	4.9E-007	1.1E-006	Arsenic	Skin	1.7E-002	--	1.3E-002	3.0E-002
			(Total)	5.9E-005	--	1.9E-004	2.4E-004	(Total)		1.7E-002	--	1.3E-002	3.0E-002
Surface Water	Surface Water	AOC 2 - ADC	Arsenic	1.8E-006	--	3.3E-006	1.8E-006	Arsenic	Skin	4.7E-002	--	8.8E-004	4.8E-002
			(Total)	1.8E-006	--	3.3E-006	1.8E-006	(Total)		4.7E-002	--	8.8E-004	4.8E-002
Sediment	Sediment	AOC 2 - ADC	Benzo(a)pyrene	4.4E-007	--	5.4E-007	9.8E-007	Benzo(a)pyrene	--	--	--	--	--
			Arsenic	5.2E-005	--	1.5E-005	6.7E-005	Arsenic	Skin	1.4E+000	--	3.8E-001	1.8E+000
			(Total)	5.3E-005	--	1.9E-005	6.8E-005	(Total)		1.4E+000	--	3.8E-001	1.8E+000
						Total Risk Across Media						Total Hazard Index Across All Media and All Exposure Routes	3.1E+000
						Total Risk Across All Media and All Exposure Routes	3.3E-004						
												Total [Skin] HI =	3.1E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Receptor Population: Area Residents (Trespassers
Receptor Age: Youth (12-17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 4 - ARC	2,3,7,8-TCDD equiv.	1.8E-007	--	1.2E-007	2.7E-007						
			Aroclor-1254	2.0E-008	--	7.1E-008	9.1E-008	Aroclor-1254	Immune	6.8E-003	--	2.0E-002	2.8E-002
			Antimony	--	--	--	--	Antimony	Whole body/blood	2.7E-003	--	8.8E-004	3.4E-003
			(Total)	1.7E-007	--	1.9E-007	3.6E-007		(Total)	8.5E-003	--	2.1E-002	2.9E-002
Building Materials	Building Materials	AOC 4 - ARC	Aroclor-1254	3.1E-007	--	1.1E-008	1.4E-008	Aroclor-1254	Immune	9.6E-002	--	3.2E-001	4.1E-001
			2,3,7,8-TCDD equiv.	1.3E-006	--	1.2E-007	1.3E-006						
			Antimony	--	--	--	--	Antimony	Whole body/blood	4.8E+000	--	1.2E+000	6.0E+000
			(Total)	1.3E-006	--	1.2E-006	1.8E-006		(Total)	4.9E+000	--	1.5E+000	6.4E+000
Surface Water	Surface Water	AOC 4 - ARC	Antimony	--	--	--		Antimony	Whole body/blood	6.9E-003	--	1.3E-004	7.0E-003
			(Total)	--	--	--	--	(Total)		6.9E-003	--	1.3E-004	7.0E-003
Sediment	Sediment	AOC 4 - ARC	Aroclor-1254	1.2E-008	--	1.5E-008	2.7E-008	Aroclor-1254	Immune	3.9E-001	--	4.4E-001	7.9E-001
			2,3,7,8-TCDD equiv.	1.2E-007	--	3.4E-008	1.6E-007						
			Antimony	--	--	--	--	Antimony	Whole body/blood	7.8E-003	--	7.2E-004	8.5E-003
			(Total)	1.3E-006	--	1.5E-006	2.8E-006	(Total)		3.9E-001	--	4.4E-001	8.0E-001
							Total Risk Across(Media)						Total Hazard Index Across All Media and All Exposure Routes 7.2E+000
							Total Risk Across All Media and All Exposure Routes 1.8E-006						

Total [Whole Body/blood] HI = 6.0E+000
Total [Immune] HI = 1.2E+000

Table 5

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
RISK ASSESSMENT SUMMARY
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Receptor Population: Area Residents
Receptor Age: Youth (12-17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure		Primary	Ingestion	Inhalation	Dermal	Exposure
Surface Water	Surface Water	AOC 6 - DSM	Arsenic	2.2E-006	--	4.0E-006	2.3E-006	Arsenic	Skin	5.7E-002	--	1.0E-003	5.9E-002
			(Total)	2.2E-006	--	4.0E-006	2.3E-006	(Total)		5.7E-002	--	1.0E-003	5.9E-002
Sediment	Sediment	AOC 6 - DSM	Arsenic	6.0E-005	--	1.7E-005	7.7E-005	Arsenic	Skin	1.6E+000	--	4.4E-001	2.0E+000
			(Total)	6.0E-005	--	1.7E-005	7.7E-005	(Total)		1.6E+000	--	4.4E-001	2.1E+000
						Total Risk Across Media						Total Hazard Index Across All Media and All Exposure Routes	2.1E+000
						Total Risk Across All Media and All Exposure Routes	7.9E-005						
												Total [Skin] HI =	2.1E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Receptor Population: Area Residents
Receptor Age: Youth (13-17 years)

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	AOC 6 - RR	Arsenic	7.9E-006	--	1.4E-009	7.9E-006	Arsenic	Skin	2.0E-003	--	3.7E-006	2.0E-003
			(Total)	7.9E-006	--	1.4E-009	7.9E-006	(Total)		6.0E-003	--	9.2E-006	6.1E-003
Sediment	Sediment	AOC 6 - RR	Arsenic	3.3E-006	--	9.3E-006	4.2E-006	Arsenic	Skin	9.8E-001	--	2.4E-001	1.1E+000
			(Total)	3.3E-006	--	9.3E-006	4.2E-006	(Total)		6.8E-001	--	2.4E-001	1.1E+000
						Total Risk Across(Media)						Total Hazard Index Across All Media and All Exposure Routes	1.1E+000
						Total Risk Across All Media and All Exposure Routes	4.2E-006						
												Total (Skin) HI =	1.1E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure		Primary	Ingestion	Inhalation	Dermal	Exposure
Surface Water	Shellfish	AOC 5 - DSM	Arsenic	1.2E-008	–	–	1.2E-008	Arsenic	Skin	7.4E-006	–	–	7.4E-006
			(Total)	1.2E-008	–	–	1.2E-008	(Total)		7.4E-006	–	–	7.4E-006
Surface Water	Surface Water	AOC 5 - DSM	Arsenic	3.5E-005	–	1.6E-005	5.1E-005	Arsenic	Skin	2.3E-001	–	1.1E-001	3.4E-001
			(Total)	3.5E-005	–	1.6E-005	5.1E-005	(Total)		2.3E-001	–	1.1E-001	3.4E-001
Sediment	Sediment	AOC 5 - DSM	Arsenic	1.9E-004	–	1.5E-004	3.4E-004	Arsenic	Skin	1.3E+000	–	9.7E-001	2.2E+000
			(Total)	1.9E-004	–	1.5E-004	3.4E-004	(Total)		1.3E+000	–	9.7E-001	2.2E+000
						Total Risk Across [Media]						Total Hazard Index Across All Media and All Exposure Routes	2.6E+000
						Total Risk Across All Media and All Exposure Routes	3.9E-004						
												Total [Skin] HI =	2.6E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Current and Future
Receptor Population: Residents
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Shellfish	AOC 6 - RR	Arsenic	4.1E-010	--	--	4.1E-010	Arsenic	Skin	2.6E-007	--	--	2.6E-007
			(Total)	4.1E-010	--	--	4.1E-010	(Total)		2.6E-007	--	--	2.6E-007
Surface Water	Surface Water	AOC 6 - RR	Arsenic	1.2E-008	--	5.7E-007	1.8E-008	Arsenic	Skin	8.0E-003	--	3.7E-003	1.2E-002
			(Total)	1.2E-008	--	5.7E-007	1.8E-008	(Total)		8.0E-003	--	3.7E-003	1.2E-002
Sediment	Sediment	AOC 6 - RR	Arsenic	1.1E-004	--	8.0E-005	1.9E-004	Arsenic	Skin	6.9E-001	--	5.3E-001	1.2E+000
			(Total)	1.1E-004	--	8.0E-005	1.9E-004	(Total)		6.9E-001	--	5.3E-001	1.2E+000
						Total Risk Across [Media]						Total Hazard Index Across All Media and All Exposure Routes	1.2E+000
						Total Risk Across All Media and All Exposure Routes	1.9E-004						
												Total [Skin] HI =	1.2E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure		Primary	Ingestion	Inhalation	Dermal	Exposure
Surface Water	Surface Water	AOC 5 - DSM	Arsenic	4.2E-005	--	6.7E-006	4.8E-005	Arsenic	Skin	1.1E+000	--	1.7E-001	1.3E+000
			(Total)	4.2E-005	--	6.7E-006	4.8E-005	(Total)		1.1E+000	--	1.7E-001	1.3E+000
Sediment	Sediment	AOC 5 - DSM	Arsenic	4.5E-004	--	1.1E-004	5.6E-004	Arsenic	Skin	1.2E+001	--	2.8E+000	1.5E+001
			(Total)	4.5E-004	--	1.1E-004	5.6E-004	(Total)		1.2E+001	--	2.8E+000	1.5E+001
						Total Risk Across [Media]						Total Hazard Index Across All Media and All Exposure Routes	1.6E+001
						Total Risk Across All Media and All Exposure Routes	6.1E-004						
												Total [Skin] HI =	1.6E+001

Table 5

RISK ASSESSMENT SUMMARY
CENTAL TENDENCY EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	AOC 5 - DSM	Arsenic	2.2E-004	--	5.2E-005	2.7E-004	Arsenic	Skin	5.6E+000	--	1.3E+000	6.9E+000
			(Total)	2.2E-004	--	5.2E-005	2.7E-004	(Total)		5.6E+000	--	1.3E+000	6.9E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	AOC 6 - RR	Arsenic	1.2E-006	--	5.7E-007	1.8E-006	Arsenic	Skin	8.0E-003	--	3.7E-003	1.2E-002
			(Total)	1.2E-006	--	5.7E-007	1.8E-006	(Total)		8.0E-003	--	3.7E-003	1.2E-002
Sediment	Sediment	AOC 6 - RR	Arsenic	2.5E-004	--	5.9E-005	3.1E-004	Arsenic	Skin	6.5E+000	--	1.5E+000	8.0E+000
			(Total)	2.5E-004	--	5.9E-005	3.1E-004	(Total)		6.5E+000	--	1.5E+000	8.0E+000
							Total Risk Across [Media]						Total Hazard Index Across All Media and All Exposure Routes: 8.0E+000
							Total Risk Across All Media and All Exposure Routes: 3.1E-004						Total [Skin] HI = 8.0E+000

Table 5

RISK ASSESSMENT SUMMARY
CENTRAL TENDENCY EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Residents
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sediment	Sediment	AOC 6 - RR						Arsenic	Skin	1.3E+000	--	3.2E-001	1.7E+000
								(Total)		1.3E+000	--	3.3E-001	1.7E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Site Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 1 - HRDD											
			Aroclor-1248	3.4E-006	--	5.3E-005	5.6E-005	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	3.1E-007	--	4.8E-006	5.1E-006	Aroclor-1254	Immune	2.1E-002	--	3.4E-001	3.6E-001
			Aroclor-1260	2.6E-007	--	4.0E-006	4.3E-006	Aroclor-1260	--	--	--	--	--
			Arsenic	1.4E-005	--	4.8E-005	6.2E-005	Arsenic	Skin	8.7E-002	--	3.0E-001	3.8E-001
			(Total)	1.8E-005	--	1.1E-004	1.3E-004	(Total)		1.1E-001	--	6.4E-001	7.5E-001
Soil	Subsurface Soil	AOC 1 - HRDD											
			Aroclor-1248	4.7E-007	--	7.3E-006	7.8E-006	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	3.5E-006	--	5.4E-007	5.8E-007	Aroclor-1254	Immune	2.4E-003	--	3.8E-002	4.0E-002
			Aroclor-1260	1.1E-006	--	1.7E-005	1.8E-005	Aroclor-1260	--	--	--	--	--
			Arsenic	6.6E-006	--	2.2E-005	2.9E-005	Arsenic	Skin	4.0E-002	--	1.4E-001	1.8E-001
			(Total)	8.2E-006	--	4.7E-005	5.5E-005	(Total)		4.2E-002	--	1.8E-001	2.2E-001
Soil	Test Pit Soil	AOC 1 - HRDD											
			Aroclor-1248	1.5E-005	--	2.3E-004	2.5E-004	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	2.2E-006	--	3.5E-005	3.7E-005	Aroclor-1254	Immune	1.5E-001	--	2.5E+000	2.7E+000
			Antimony	--	--	--	--	Antimony	Whole body/blood	1.6E+000	--	1.9E+000	3.5E+000
			Arsenic	1.9E-004	--	8.4E-004	8.3E-004	Arsenic	Skin	1.2E+000	--	4.0E+000	5.2E+000
			(Total)	2.1E-004	--	9.1E-004	1.1E-003	(Total)		2.9E+000	--	8.4E+000	1.1E+001
							Total Risk Across(Media)						Total Hazard Index Across All Media and All Exposure Routes
							Total Risk Across All Media and All Exposure Routes						
							1.3E-003						1.2E+001

Total [Skin] HI =	5.8E+000
Total [Immune] HI =	3.1E+000
Total (Whole Body/Blood) HI =	3.5E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Site Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 2 - ADC	Benzo(a)anthracene	2.8E-007	--	4.0E-006	4.0E-006	Benzo(a)anthracene	--	--	--	--	--
			Benzo(b)fluoranthene	3.9E-006	--	5.7E-005	6.1E-005	Benzo(b)fluoranthene	--	--	--	--	--
			Benzo(a)pyrene	2.6E-005	--	3.8E-004	4.1E-004	Benzo(a)pyrene	--	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.6E-006	--	2.3E-005	2.5E-005	Indeno(1,2,3-cd)pyrene	--	--	--	--	--
			Dibenzo(a,h)anthracene	3.0E-006	--	4.4E-005	4.7E-005	Dibenzo(a,h)anthracene	--	--	--	--	--
			Methoxychlor	--	--	--	--	Methoxychlor	Reproductive	9.6E-002	--	1.1E+000	1.2E+000
			Aroclor-1248	1.2E-005	--	1.8E-004	2.0E-004	Aroclor-1248	--	--	--	--	--
			Aroclor-1260	9.0E-007	--	1.4E-005	1.5E-005	Aroclor-1260	--	--	--	--	--
			Arsenic	4.4E-004	--	1.8E-008	4.4E-004	Arsenic	Skin	5.9E+000	--	2.1E+001	2.7E+001
			(Total)	4.9E-004	--	7.5E-004	1.2E-003	(Total)		6.0E+000	--	2.2E+001	2.8E+001
Soil	Subsurface Soil	AOC 2 - ADC	1,2-Dichloroethane	6.4E-008	--	7.1E-004	7.2E-004	1,2-Dichloroethane	--	6.4E-003	--	7.4E-001	7.5E-001
			Benzo(b)fluoranthene	4.1E-007	--	6.0E-006	6.4E-006	Benzo(b)fluoranthene	--	--	--	--	--
			Benzo(a)pyrene	8.2E-006	--	8.9E-005	9.5E-005	Benzo(a)pyrene	--	--	--	--	--
			Methoxychlor	--	--	--	--	Methoxychlor	Reproductive	7.4E-002	--	8.7E-001	9.4E-001
			Aroclor-1242	3.8E-006	--	5.9E-005	6.3E-005	Aroclor-1242	--	--	--	--	--
			Aroclor-1248	2.7E-005	--	4.1E-004	4.4E-004	Aroclor-1248	--	--	--	--	--
			Arsenic	2.2E-004	--	7.5E-004	9.7E-004	Arsenic	Skin	1.4E+000	--	4.7E+000	6.1E+000
			(Total)	2.6E-004	--	2.0E-003	2.3E-003	(Total)		1.4E+000	--	4.9E+000	7.6E+000
Building Materials	Building Materials	AOC 2 - ADC	Benzo(a)anthracene	1.4E-004	--	2.1E-003	2.2E-003	Benzo(a)anthracene	--	--	--	--	--
			Benzo(b)fluoranthene	1.8E-004	--	2.7E-003	2.9E-003	Benzo(b)fluoranthene	--	--	--	--	--
			Benzo(a)pyrene	1.4E-003	--	2.1E-002	2.2E-002	Benzo(a)pyrene	--	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.9E-005	--	5.7E-004	6.1E-004	Indeno(1,2,3-cd)pyrene	--	--	--	--	--
			Dibenzo(a,h)anthracene	1.2E-004	--	1.7E-003	1.8E-003	Dibenzo(a,h)anthracene	--	--	--	--	--
			Fluoranthene	--	--	--	--	Fluoranthene	Kidney/liver	4.8E-002	--	7.2E-001	7.7E-001
			Pyrene	--	--	--	--	Pyrene	Kidney	4.6E-002	--	6.9E-001	7.4E-001
			Methoxychlor	--	--	--	--	Methoxychlor	Reproductive	1.5E-002	--	1.7E-001	1.9E-001
			Arsenic	2.3E-005	--	7.6E-006	8.9E-005	Arsenic	Skin	1.4E-001	--	4.8E-001	6.2E-001
			(Total)	1.9E-003	--	2.8E-002	3.0E-002	(Total)		2.2E-001	--	1.7E+000	1.9E+000
						Total Risk Across [Media]						Total Hazard Index Across All Media and All Exposure Routes	3.8E+001
						Total Risk Across All Media and All Exposure Routes	3.4E-002						

Total [Skin] HI =	3.4E+001
Total [Kidney] HI =	1.9E+000
Total [Reproductive] HI =	2.3E+000

Table 5

RISK ASSESSMENT SUMMARY
CENTRAL TENDENCY EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Site Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Building Materials	Building Materials	AOC 2 - ADC	Benzo(a)anthracene	7.9E-006	--	2.1E-004	2.1E-004						
			Benzo(b)fluoranthene	9.1E-006	--	2.4E-004	2.4E-004						
			Benzo(a)pyrene	7.2E-005	--	1.9E-003	1.9E-003						
			Indeno(1,2,3-cd)pyrene	2.5E-006	--	6.6E-005	6.9E-005						
			Dibenzo(a,h)anthracene	7.1E-006	--	1.9E-004	2.0E-004						
			Fluoranthene	--	--	--	--						
			Pyrene	--	--	--	--						
			Methoxychlor	--	--	--	--						
			Arsenic	1.6E-006	--	9.7E-005	9.9E-005						
			(Total)	1.0E-004	--	2.6E-003	2.7E-003						

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Site Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 3 - SPD	Benzo(a)anthracene	2.2E-007	–	3.2E-008	3.4E-005	Benzo(a)anthracene	–	–	–	–	–
			Benzo(b)fluoranthene	3.6E-007	–	5.5E-008	5.9E-008	Benzo(b)fluoranthene	–	–	–	–	–
			Benzo(a)pyrene	1.9E-008	–	2.8E-005	3.0E-005	Benzo(a)pyrene	–	–	–	–	–
			Indeno(1,2,3-cd)pyrene	1.7E-007	–	2.5E-008	2.7E-008	Indeno(1,2,3-cd)pyrene	–	–	–	–	–
			Arsenic	6.5E-008	–	2.2E-005	2.9E-005	Arsenic	Skin	3.9E-002	–	1.4E-001	1.8E-001
			(Total)	6.2E-006	–	6.1E-005	7.0E-005	(Total)		3.9E-002	–	1.4E-001	1.8E-001
Soil	Subsurface Soil	AOC 3 - SPD	Benzo(a)pyrene	1.2E-007	–	1.8E-008	1.9E-008	Benzo(a)pyrene	–	–	–	–	–
			Aroclor-1254	5.9E-008	–	9.2E-007	9.8E-007	Aroclor-1254	Immune	4.0E-003	–	6.5E-002	6.9E-002
			Aroclor-1260	6.3E-008	–	9.9E-007	1.1E-006	Aroclor-1260	–	–	–	–	–
			Arsenic	7.8E-006	–	2.6E-005	3.4E-005	Arsenic	Skin	4.7E-002	–	1.7E-001	2.2E-001
			(Total)	8.0E-006	–	3.0E-005	3.8E-005	(Total)		5.1E-002	–	2.4E-001	2.9E-001
Soil	Test Pit Soil	AOC 3 - SPD	Hexachloroethane	2.6E-005	–	2.9E-004	3.2E-004	Hexachloroethane	Kidney	5.0E+000	–	5.8E+001	6.3E+001
			Benzo(a)pyrene	6.2E-006	–	8.9E-005	9.5E-005	Benzo(a)pyrene	–	–	–	–	–
			Dibenzo(a,h)anthracene	1.2E-006	–	1.7E-005	1.2E-006	Dibenzo(a,h)anthracene	–	–	–	–	–
			Aroclor-1248	7.8E-006	–	1.2E-004	1.3E-004	Aroclor-1248	–	–	–	–	–
			Aroclor-1254	2.2E-006	–	3.4E-005	3.6E-005	Aroclor-1254	Immune	1.5E-001	–	2.4E+000	2.6E+000
			Arsenic	2.1E-005	–	8.9E-005	9.0E-005	Arsenic	Skin	1.3E-001	–	4.4E-001	5.7E-001
			(Total)	6.4E-005	–	8.2E-004	8.8E-004	(Total)		5.3E+000	–	8.1E+001	8.6E+001
							Total Risk Across(Media)						Total Hazard Index Across All Media and All Exposure Routes
							7.9E-004						8.7E+001

Total [Skin] HI =	9.7E-001
Total [Kidney] HI =	6.3E+001
Total [Immune] HI =	2.6E+000

Table 5

RISK ASSESSMENT SUMMARY

REASONABLE MAXIMUM EXPOSURE

HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Site Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 4 - ARC											
			Aroclor-1248	3.2E-007	--	5.0E-006	5.3E-006	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	7.0E-007	--	1.1E-005	1.2E-005	Aroclor-1254	Immune	4.8E-002	--	7.7E-001	8.2E-001
			Aroclor-1260	1.7E-007	--	2.8E-006	2.8E-006	Aroclor-1260	--	--	--	--	--
			Antimony	--	--	--	--	Antimony	Whole body/blood	2.2E-002	--	2.6E-002	4.8E-002
			Arsenic	7.3E-008	--	2.4E-005	3.1E-005	Arsenic	Skin	4.4E-002	--	1.5E-001	1.9E-001
			(Total)	6.5E-006	--	4.3E-005	5.1E-005		(Total)	1.1E-001	--	9.5E-001	1.1E+000
Soil	Subsurface Soil	AOC 4 - ARC											
			Aroclor-1248	5.4E-008	--	8.3E-007	8.8E-007	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	2.0E-008	--	3.1E-007	3.3E-007	Aroclor-1254	Immune	1.4E-003	--	2.2E-002	2.3E-002
			Antimony	--	--	--	--	Antimony	Whole body/blood	2.6E-003	--	3.0E-003	5.6E-003
			Arsenic	3.5E-008	--	1.2E-005	1.6E-005	Arsenic	Skin	2.1E-002	--	7.4E-002	9.5E-002
			(Total)	3.6E-006	--	1.3E-005	1.7E-005	(Total)		2.5E-002	--	9.8E-002	1.2E-001
Building Materials	Building Materials	AOC 4 - ARC											
			Aroclor-1254	1.1E-005	--	1.7E-004	1.8E-004	Aroclor-1254	Immune	7.4E-001	--	1.2E+001	1.3E+001
			2,3,7,8-TCDD equiv.	4.6E-004	--	1.5E-003	2.0E-003	2,3,7,8-TCDD equiv.	--	--	--	--	--
			Antimony	--	--	--	--	Antimony	Whole body/blood	3.9E+001	--	4.5E+001	8.4E+001
			Arsenic	6.9E-006	--	2.3E-004	3.0E-004	Arsenic	Skin	4.1E-001	--	1.4E+000	1.8E+000
			(Total)	5.4E-004	--	1.9E-003	2.5E-003		(Total)	4.0E+001	--	5.8E+001	9.8E+001
			Total Risk Across(Media)						Total Hazard Index Across All Media and All Exposure Routes				1.0E+002
			Total Risk Across All Media and All Exposure Routes				2.6E-003						

Total [Skin] HI =	2.3E+000
Total [Whole Body/blood] HI =	8.4E+001
Total [Immune] HI =	1.4E+001

Table 5

RISK ASSESSMENT SUMMARY
CENTRAL TENDENCY EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Site Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Building Materials	Building Materials	AOC 4 - ARC	Aroclor-1254	2.6E-007	--	7.4E-008	7.7E-008	Aroclor-1254	Immune	6.6E-002	--	1.4E+000	1.5E+000
			2,3,7,8-TCDD equiv.	1.1E-005	--	6.8E-006	7.9E-005	2,3,7,8-TCDD equiv.	--	--	--	--	--
			Antimony	--	--	--	--	Antimony	Whole body/blood	4.5E+000	--	8.1E+000	1.3E+001
			Arsenic	5.5E-009	--	3.5E-006	3.6E-006	Arsenic	Skin	1.6E-001	--	6.6E-001	8.6E-001
			(Total)	1.7E-005	--	1.1E-004	1.2E-004		(Total)	4.7E+000	--	1.0E+001	1.5E+001

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 1 - HRDD	Aroclor-1248	3.2E-007	--	5.9E-007	9.1E-007	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	2.9E-008	--	5.2E-008	8.1E-008	Aroclor-1254	Immune	5.1E-002	--	9.5E-002	1.5E-001
			Aroclor-1260	2.4E-008	--	4.4E-008	6.8E-008	Aroclor-1260	--	--	--	--	--
			Arsenic	1.4E-008	--	5.2E-007	1.9E-008	Arsenic	Skin	2.1E-001	--	8.5E-002	3.0E-001
			(Total)	1.8E-008	--	1.2E-008	3.0E-008	(Total)		2.6E-001	--	1.8E-001	4.4E-001
Soil	Subsurface Soil	AOC 1 - HRDD	Aroclor-1248	4.4E-008	--	8.0E-008	1.2E-007	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	3.9E-009	--	5.9E-009	9.2E-009	Aroclor-1254	Immune	5.8E-003	--	1.1E-002	1.7E-002
			Aroclor-1260	1.1E-007	--	1.9E-007	3.0E-007	Aroclor-1260	--	--	--	--	--
			Arsenic	6.2E-007	--	2.4E-007	8.6E-007	Arsenic	Skin	9.8E-002	--	3.9E-002	1.4E-001
			(Total)	7.8E-007	--	5.2E-007	1.3E-006	(Total)		1.0E-001	--	5.0E-002	1.5E-001
Soil	Test Pit Soil	AOC 1 - HRDD	Aroclor-1248	1.4E-006	--	2.5E-006	3.9E-006	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	2.1E-007	--	3.8E-007	5.9E-007	Aroclor-1254	Immune	3.7E-001	--	6.8E-001	1.1E+000
			Antimony	--	--	--	--	Antimony	Whole body/blood	3.9E+000	--	5.2E-001	4.4E+000
			Arsenic	1.8E-005	--	7.0E-006	2.5E-005	Arsenic	Skin	2.8E+000	--	1.1E+000	3.9E+000
			(Total)	2.0E-005	--	1.0E-005	3.0E-005	(Total)		7.1E+000	--	2.3E+000	9.5E+000
						Total Risk Across [Media]						Total Hazard Index Across All Media and All Exposure Routes	1.0E+001
						Total Risk Across All Media and All Exposure Routes	3.4E-005						

Total [Skin] HI =	4.3E+000
Total [Immune] HI =	1.2E+000
Total [Whole Body/Blood] HI =	4.4E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 2 - ADC	Benzo(a)anthracene	2.6E-007	--	4.4E-007	7.0E-007	Benzo(a)anthracene	--	--	--	--	--
			Benzo(b)fluoranthene	3.7E-007	--	6.3E-007	1.0E-006	Benzo(b)fluoranthene	--	--	--	--	--
			Benzo(a)pyrene	2.5E-006	--	4.2E-006	6.7E-006	Benzo(a)pyrene	--	--	--	--	--
			Indeno(1,2,3-cd)pyrene	1.5E-007	--	2.5E-007	4.0E-007	Indeno(1,2,3-cd)pyrene	--	--	--	--	--
			Dibenzo(a,h)anthracene	2.6E-007	--	4.6E-007	7.7E-007	Dibenzo(a,h)anthracene	--	--	--	--	--
			Methoxychlor	--	--	--	--	Methoxychlor	Reproductive	2.4E-001	--	4.4E-001	6.8E-001
			Arsenic	4.1E-005	--	1.6E-006	4.1E-005	Arsenic	Skin	1.9E+001	--	5.6E+000	2.1E+001
			(Total)	4.5E-005	--	6.0E-006	5.1E-005	(Total)		1.9E+001	--	6.2E+000	2.1E+001
Soil	Subsurface Soil	AOC 2 - ADC	Benzo(b)fluoranthene	3.9E-008	--	6.6E-008	1.1E-007	Benzo(b)fluoranthene	--	--	--	--	--
			Benzo(a)pyrene	5.8E-007	--	9.8E-007	1.6E-006	Benzo(a)pyrene	--	--	--	--	--
			Methoxychlor	--	--	--	--	Methoxychlor	Reproductive	1.8E-001	--	2.4E-001	4.2E-001
			Arsenic	2.1E-005	--	8.2E-006	2.9E-005	Arsenic	Skin	3.3E+000	--	1.3E+000	4.6E+000
			(Total)	2.2E-005	--	9.2E-006	3.1E-005	(Total)		3.5E+000	--	1.5E+000	5.0E+000
Building Materials	Building Materials	AOC 2 - ADC	Benzo(a)anthracene	1.4E-005	--	2.3E-005	3.7E-005	Benzo(a)anthracene	--	--	--	--	--
			Benzo(b)fluoranthene	1.7E-005	--	2.9E-005	4.6E-005	Benzo(b)fluoranthene	--	--	--	--	--
			Benzo(a)pyrene	1.4E-004	--	2.3E-004	3.7E-004	Benzo(a)pyrene	--	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3.7E-006	--	6.3E-006	1.0E-005	Indeno(1,2,3-cd)pyrene	--	--	--	--	--
			Dibenzo(a,h)anthracene	1.1E-005	--	1.9E-005	3.0E-005	Dibenzo(a,h)anthracene	--	--	--	--	--
			Methoxychlor	--	--	--	--	Methoxychlor	Reproductive	3.6E-002	--	3.6E-003	4.0E-002
			Arsenic	2.1E-006	--	8.9E-007	2.9E-006	Arsenic	Skin	3.4E-001	--	1.0E-002	3.5E-001
			(Total)	1.9E-004	--	3.1E-004	5.0E-004	(Total)		3.8E-001	--	1.4E-002	3.9E-001
						Total Risk Across Media						Total Hazard Index Across All Media and All Exposure Routes	2.7E+001
						Total Risk Across All Media and All Exposure Routes	5.8E-004						

Total [Skin] HI =	2.6E+001
Total [Reproductive] HI =	1.1E+000

Table 5

RISK ASSESSMENT SUMMARY
CENTRAL TENDENCY EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Building Materials	Building Materials	AOC 2 - ADC	Benzo(a)anthracene	5.8E-006	--	9.8E-006	1.6E-005						
			Benzo(b)fluoranthene	6.7E-006	--	1.1E-005	1.8E-005						
			Benzo(a)pyrene	5.3E-005	--	8.9E-005	1.4E-004						
			Indeno(1,2,3-cd)pyrene	1.9E-006	--	3.1E-005	3.3E-005						
			Dibenzo(a,h)anthracene	5.3E-006	--	8.9E-006	1.4E-005						
			Methoxychlor	--	--	--	--						
			Arsenic	1.2E-006	--	4.6E-007	1.7E-006						
			(Total)	7.4E-005	--	1.2E-004	2.0E-004						

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Test Pit Soil	AOC 3 - SPD	Hexachloroethane	2.4E-008	--	3.1E-008	5.5E-008	Hexachloroethane	Kidney	1.2E+001	--	1.6E+001	2.8E+001
			Aroclor-1248	7.1E-007	--	1.30E-006	2.0E-006	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	2.0E-007	--	3.70E-007	5.7E-007	Aroclor-1254	Immune	3.8E-001	--	6.7E-001	1.0E+000
			(Total)	3.3E-006	--	4.8E-006	8.1E-006	(Total)		1.2E+001	--	1.7E+001	2.8E+001
						Total Risk Across [Media]						Total Hazard Index Across All Media and All Exposure Routes	2.8E+001
						Total Risk Across All Media and All Exposure Routes	8.1E-006						

Total [Kidney] HI = 2.8E+001
Total [Immune] HI = 1.0E+000

Table 5

RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 4 - ARC											
			Aroclor-1248	3.0E-006	–	5.5E-006	8.5E-006	Aroclor-1248	–	–	–	–	–
			Aroclor-1254	6.0E-006	–	1.2E-007	1.9E-007	Aroclor-1254	Immune	1.2E-001	–	2.2E-001	3.4E-001
			Aroclor-1260	1.8E-006	–	2.9E-006	4.5E-006	Aroclor-1260	–	–	–	–	–
			Antimony	–	–	–	–	Antimony	Whole body/blood	5.4E-002	–	7.2E-003	6.1E-002
			Arsenic	6.9E-007	–	2.7E-007	9.8E-007	Arsenic	Skin	1.1E-001	–	4.3E-002	1.5E-001
			(Total)	6.0E-007	–	4.7E-007	1.3E-006		(Total)	2.8E-001	–	2.7E-001	5.5E-001
Soil	Subsurface Soil	AOC 4 - ARC											
			Aroclor-1248	5.1E-009	–	9.2E-009	1.4E-008	Aroclor-1248	–	–	–	–	–
			Aroclor-1254	1.9E-009	–	3.4E-009	5.3E-009	Aroclor-1254	Immune	3.4E-003	–	6.3E-003	9.7E-003
			Antimony	–	–	–	–	Antimony	Whole body/blood	6.3E-003	–	8.4E-004	7.1E-003
			Arsenic	3.3E-007	–	1.3E-007	4.6E-007	Arsenic	Skin	5.2E-002	–	2.1E-002	7.3E-002
			(Total)	3.4E-007	–	1.4E-007	4.8E-007	(Total)		6.2E-002	–	2.8E-002	9.0E-002
Building Materials	Building Materials	AOC 4 - ARC											
			Aroclor-1254	1.0E-006	–	1.8E-006	2.8E-006	Aroclor-1254	Immune	1.8E+000	–	3.4E+000	5.2E+000
			2,3,7,8-TCDD equiv.	4.3E-005	–	1.7E-006	6.0E-005	2,3,7,8-TCDD equiv.	–	–	–	–	–
			Antimony	–	–	–	–	Antimony	Whole body/blood	8.5E+001	–	1.3E+001	1.1E+002
			Arsenic	6.5E-006	–	2.5E-006	9.0E-006	Arsenic	Skin	1.0E+000	–	4.1E-001	1.4E+000
			(Total)	5.1E-005	–	4.3E-006	7.2E-005		(Total)	8.8E+001	–	1.7E+001	1.1E+002
			Total Risk Across [Media]						Total Hazard Index Across All Media and All Exposure Routes				1.2E+002
			Total Risk Across All Media and All Exposure Routes				7.4E-005						

Total [Skin] HI =	1.8E+000
Total [Whole Body/blood] HI =	1.1E+002
Total [Immune] HI =	5.8E+000

Table 5

RISK ASSESSMENT SUMMARY
CENTRAL TENDENCY EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEW JERSEY

Scenario Timeframe: Future
Receptor Population: Construction Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Building Materials	Building Materials	AOC 4 - ARC						Aroclor-1254	Immune	3.4E-001	--	6.3E-001	9.7E-001
								2,3,7,8-TCDD equiv.	--	--	--	--	--
								Antimony	Whole body/blood	2.7E+001	--	3.8E+000	3.1E+001
								Arsenic	Skin	6.2E-001	--	2.6E-001	8.7E-001
									(Total)	2.8E+001	--	4.5E+000	3.2E+001

TABLE 6 RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEWJERSEY

Scenario Timeframe: Future
Medium: Building Materials
Exposure Medium: Building Materials
Exposure Point: AOC 4 - ARC
Receptor Population: Site Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose (2)	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion													
	Aroclor-1254	3300	ug/kg	3300	ug/kg	M	1.6E-06	mg/kg-day	2.0E-05	mg/kg-day	N/A	N/A	8.1E-02
	2,3,7,8-TCDD equiv	1.26	ug/kg	1.26	ug/kg	M	6.2E-10	mg/kg-day	--	mg/kg-day	N/A	N/A	--
	Antimony	158	mg/kg	158	mg/kg	M	7.7E-05	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	1.9E-01
	Arsenic	55.7	mg/kg	55.7	mg/kg	M	2.7E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	9.1E-02
	(Total)												3.7E-01
Dermal													
	Aroclor-1254	3300	ug/kg	3300	ug/kg	M	2.6E-05	mg/kg-day	2.0E-05	mg/kg-day	N/A	N/A	1.3E+00
	2,3,7,8-TCDD equiv	1.26	ug/kg	1.26	ug/kg	M	2.2E-09	mg/kg-day	--	mg/kg-day	N/A	N/A	--
	Antimony	158	mg/kg	158	mg/kg	M	9.0E-05	mg/kg-day	4.0E-04	mg/kg-day	N/A	N/A	2.3E-01
	Arsenic	55.7	mg/kg	55.7	mg/kg	M	9.5E-05	mg/kg-day	3.0E-04	mg/kg-day	N/A	N/A	3.2E-01
	(Total)												1.9E+00
												Total Hazard Index Across All Exposure Routes/Pathways	2.2E+00

(1) Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.
(2) Chronic

-- - Reference Dose not available, therefore Hazard Quotient not calculated
N/A - Not Applicable

TABLE 6 RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEWJERSEY

Scenario Timeframe: Future
Medium: Building Materials
Exposure Medium: Building Materials
Exposure Point: AOC 4 - ARC
Receptor Population: Site Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation (1)	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Dose Units	Cancer Risk
Ingestion											
	Aroclor-1254	3300	ug/kg	3300	ug/kg	M	5.9E-07	mg/kg-day	2.0E+00	mg/kg-day	1.2E-06
	2,3,7,8-TCDD equiv.	1.26	ug/kg	1.26	ug/kg	M	2.3E-10	mg/kg-day	1.5E+05	mg/kg-day	3.4E-05
	Antimony	158	mg/kg	158	mg/kg	M	2.8E-05	mg/kg-day	--	mg/kg-day	--
	Arsenic	55.7	mg/kg	55.7	mg/kg	M	1.0E-05	mg/kg-day	1.5E+00	mg/kg-day	1.5E-05
	(Total)										5.0E-05
Dermal											
	Aroclor-1254	3300	ug/kg	3300	ug/kg	M	9.2E-06	mg/kg-day	2.0E+00	mg/kg-day	1.8E-05
	2,3,7,8-TCDD equiv.	1.26	ug/kg	1.26	ug/kg	M	7.6E-10	mg/kg-day	1.5E+05	mg/kg-day	1.1E-04
	Antimony	158	mg/kg	158	mg/kg	M	3.2E-05	mg/kg-day	--	mg/kg-day	--
	Arsenic	55.7	mg/kg	55.7	mg/kg	M	3.3E-05	mg/kg-day	1.5E+00	mg/kg-day	5.0E-05
	(Total)										1.8E-04
											2.3E-04

(1) Medium-Specific (M) or Route-Specific (R) EPC selected for hazard calculation.

-- - Cancer Slope Factor not available, therefore Cancer Risk not calculated.
N/A - Not Applicable.

TABLE 6 RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
HORSESHOE ROAD COMPLEX SITE, SAYREVILLE, NEWJERSEY

Scenario Timeframe: Future
Receptor Population: Site Workers
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	AOC 4 - ARC	Benzo(b)fluoranthene	3 4E-07	--	4.9E-06	5 2E-06	Benzo(b)fluoranthene	--	--	--	--	--
			Benzo(a)pyrene	2 4E-06	--	3 4E-05	3 6E 05	Benzo(a)pyrene	--	--	--	--	--
			Hexachlorobutadiene	9.5E-06	--	1 1E-06	1 2E-06	Hexachlorobutadiene	Kidney	1 7E-02	--	1 9E-01	2 1E-01
			Hexachlorocyclopentadiene	--	--	--	--	Hexachlorocyclopentadiene	Stomach	4 0E-03	--	4 7E-02	5 1E-02
			Aldrin	6 7E-08	--	7.5E-07	8.2E-07	Aldrin	Liver	3 6E-04	--	4 2E-03	4 6E-03
			Aroclor-1248	3 2E-07	--	5 0E-06	5.3E-06	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	7.0E-07	--	1.1E-05	1.2E-05	Aroclor-1254	Immune	4 8E-02	--	7 7E-01	8 2E-01
			Aroclor-1260	1 7E-07	--	2.6E-06	2 8E-06	Aroclor-1260	--	--	--	--	--
			2,3,7,8-TCDD equiv.	5.4E-06	--	1.8E-05	2.3E-05	2,3,7,8-TCDD equiv	--	--	--	--	--
			Aluminum	--	--	--	--	Aluminum	--	7.6E-03	--	8.8E-03	1 6E-02
			Antimony	--	--	--	--	Antimony	Whole body/blood	2 2E-02	--	2.6E-02	4 8E-02
			Arsenic	7 3E-06	--	2.4E-05	3 1E-05	Arsenic	Skin	4.4E-02	--	1 5E-01	1 9E-01
			Cadmium	--	--	--	--	Cadmium	Kidney	1 8E-02	--	2 1E-03	2 0E-02
			Copper	--	--	--	--	Copper	--	7 2E-03	--	8 4E-03	1 6E-02
			Manganese	--	--	--	--	Manganese	--	9 4E-03	--	1 1E-02	2 0E-02
			Nickel	--	--	--	--	Nickel	Body organs	7.3E-03	--	8 4E-03	1 6E-02
			Silver	--	--	--	--	Silver	Skin	2 8E-02	--	3 3E-02	6 1E-02
			Thallium	--	--	--	--	Thallium	Liver/blood	5 0E-03	--	5 9E-03	1 1E-02
			Zinc	--	--	--	--	Zinc	Blood	1.5E-02	--	1 7E-02	3 2E-02
			(Total)	1 7E-05	--	1 0E-04	1 2E-04		(Total)	2.3E-01	--	1.3E+00	1.5E+00
Soil	Subsurface Soil	AOC 4 - ARC	Tetrachloroethene	1 8E-07	--	2 0E-05	2 0E-05	Tetrachloroethene	Liver	9.4E-04	--	1 1E-01	1 1E-01
			Chlorobenzene	--	--	--		Chlorobenzene	Liver	7 3E-04	--	8.5E-02	8 8E-02
			Benzo(a)anthracene	1 0E-07	--	1 5E-06	1 6E-06	Benzo(a)anthracene	--	--	--	--	--
			Benzo(b)fluoranthene	1 1E-07	--	1 6E-06	1 7E-06	Benzo(b)fluoranthene	--	--	--	--	--
			Benzo(a)pyrene	1 0E-06	--	1 5E-05	1 6E-05	Benzo(a)pyrene	--	--	--	--	--
			Indeno(1,2,3-cd)pyrene	9 1E-08	--	1 3E-06	1.4E-06	Indeno(1,2,3-cd)pyrene	--	--	--	--	--
			1,2,4-Trichlorobenzene	--	--	--	--	1,2,4-Trichlorobenzene	Adrenal	5.5E-03	--	6.4E-02	7 0E-02
			Aldrin	1 7E-08	--	1.9E-07	2 1E-07	Aldrin	Liver	9 3E-05	--	1.1E-03	1 2E-03
			Aroclor-1248	5 4E-08	--	6 3E-07	6.8E-07	Aroclor-1248	--	--	--	--	--
			Aroclor-1254	2 0E-08	--	3.1E-07	3 3E-07	Aroclor-1254	Immune	1 4E-03	--	2.2E-02	2 3E-02
			Aluminum	--	--	--	--	Aluminum	--	6 4E-03	--	7 4E-03	1 4E-02
			Antimony	--	--	--	--	Antimony	Whole body/blood	2 6E-03	--	3 0E-03	5 6E 03
			Arsenic	3.3E-06	--	1.2E-05	1 6E-05	Arsenic	Skin	2 1E-02	--	7 4E-02	9 5E 02
			Manganese	--	--	--	--	Manganese	--	2 7E-03	--	3 2E-03	5 9E-03
			Thallium	--	--	--	--	Thallium	Liver/blood	7 7E-03	--	9 0E-03	1 7E-02
			Vanadium	--	--	--	--	Vanadium	None	3.0E-03	--	3.5E-03	6.5E-03
			(Total)	5.1E-06	--	5 2E-05	5 7E-05		(Total)	5 2E-02	--	3 8E-01	4 3E-01
Building Materials	Building Materials	AOC 4 - ARC	Aroclor-1254	1 2E-06	--	1 8E-05	1 9E-05	Aroclor-1254	Immune	8 1E-02	--	1 3E+00	1 4E+00
			2,3,7,8-TCDD equiv	2.4E-05	--	1 1E-04	1.4E-04	2,3,7,8-TCDD equiv	--	--	--	--	--
			Antimony	--	--	--	--	Antimony	Whole body/blood	1.9E-01	--	2 3E-01	4 2E-01
			Arsenic	1.5E-05	--	5 0E-05	6.5E-05	Arsenic	Skin	9 1E-02	--	3 2E-01	4 1E-01
			(Total)	5.0E-05	--	1 8E-04	2 3E-04		(Total)	3.6E-01	--	1 9E+00	2 2E+00
			Total Risk Across (Media)						Total Hazard Index Across All Media and All Exposure Routes				4 2E+00
			Total Risk Across All Media and All Exposure Routes				4.0E-04						

Total (Skin) HI =	7 6E 01
Total (Whole Body/blood) HI =	4 7E-01
Total (Immune) HI =	2 2E+00

Table 7

Cost Estimate for Alternative 3
Demolition of Buildings and Structures, Decontamination of Concrete Slabs,
Surface Cleaning and Recycle of Metal/Concrete/Brick, and Offsite Disposal of Remaining Wastes

Item	Quantity		Unit Cost	Units	Capital Cost		O&M Cost	
	ARC	ADC			ARC	ADC	Annual	Pres. Worth
(1) Initial Characterization Study								
(a) Walls and roofs								
Labor	80	60	$65	hour	$5,200	$3,900		
Analysis (TCLP, ignit, corrosivity, reactivity)	60	45	$1,135	sample	$68,100	$51,075		
Labor	40	30	$65	hour	$2,600	$1,950		
Analysis (metals, pesticides, PAHs)	60	45	$649	sample	$38,940	$29,205		
(b) Concrete slabs								
Labor	24	16	$65	hour	$1,560	$1,040		
Analysis (metals, pesticides, PAHs)	10	5	$649	sample	$6,490	$3,245		
(c) Tanks and process equipment								
Labor	40	20	$65	hour	$2,600	$1,300		
Analysis (TCLP, ignit, corrosivity, reactivity)	16	8	$1,135	sample	$18,160	$9,080		
Labor	20	10	$65	hour	$1,300	$650		
Analysis (metals, pest, PAHs)	8	4	$649	sample	$5,192	$2,596		
(d) Asbestos containing material								
Labor	24	24	$65	hour	$1,560	$1,560		
Analysis (percent asbestos)	10	10	$100	sample	$1,000	$1,000		
(e) Lead-based paint								
Labor	16	8	$65	hour	$1,040	$520		
Analysis (TCLP lead)	10	5	$55	sample	$550	275		
(f) Work plan and reporting								
Labor	120	120	$65	hour	$7,800	$7,800		
Subtotal (1)					$162,092	$115,196		$0
(2) Demolition and Metal Surface Cleaning								
(a) Mobilization	1	1	$15,000	lump sum	$15,000	$15,000		
(b) Walls and roofs								
Backhoe with 2 attachments	3	2	$37,686	month	$113,058	$75,372		
Backhoe to load debris into rolloffs	3	2	$6,805	month	$20,415	$13,610		
Labor (2 crews of 2 people)	3	2	$31,460	month	$94,380	$62,920		
(c) Tanks and process equipment								
Acetylene torch	3	2	$1,723	month	$5,169	$3,446		
Backhoe to load debris into rolloffs	3	2	$6,805	month	$20,415	$13,610		
Labor (1 crew of 2 people)	3	2	$15,730	month	$47,190	$31,460		
(d) Vacuum truck to pump out tanks/process equip	4	4	$1,601	week	$6,404	$6,404		
(e) Metal Surface Cleaning								
Low pressure wash	4	4	$171	week	$684	$684		
Labor (1 crew of 2 people)	4	4	$3,575	week	$14,300	$14,300		
Subtotal (2)					$337,015	$236,806		$0
(3) Offsite Disposal								
(a) Non-hazardous waste								
Hauling	628	115	$10	ton	$6,280	$1,150		
Disposal	628	115	$49	ton	$30,772	$5,635		
(b) Hazardous waste (solid)								
Hauling	318	59	$88	ton	$27,984	$5,192		
Disposal	318	59	$157	ton	$49,926	$9,263		

Table 7

Cost Estimate for Alternative 3
Demolition of Buildings and Structures, Decontamination of Concrete Slabs
Surface Cleaning and Recycle of Metal/Concrete/Brick, and Offsite Disposal of Remaining Wastes

(c) Hazardous waste (liquid and metal wash water)								
Hauling	2	2	$879	load	$1,758	$1,758		
Disposal	2	2	$2,503	load	$5,006	$5,006		
(d) Asbestos containing material								
Hauling	0	3	$10	ton	$0	$30		
Asbestos	0	3	$49	ton	$0	$147		
(e) Scrap metal recycle								
Salvage Value	76	50	($45)	ton	($3,420)	($2,250)		
(f) Concrete/Brick Recycle								
Hauling	2,169	370	$4	ton	$8,676	$1,480		
Recycle Fee	2,169	370	$3	ton	$6,507	$1,110		
Subtotal (3)					$133,489	$28,521		$0
(4) Concrete Slab Decontamination								
(a) Vacuum surface with a HEPA filter unit	21,500	15,850	$0.17	SF	$3,655	$2,695		
(b) Sealant coating application	21,500	15,850	$0.34	SF	$7,310	$5,389		
Subtotal (4)					$10,965	$8,084		$0
(5) Fence Repair/Upgrade	50	50	$14	LF	$700	$700		
Subtotal (5)					$700	$700		$0
CONSTRUCTION SUBTOTAL					$644,261	$389,307		
Health and Safety	5% of Construction Subtotal				$32,213	$19,465		
Bid Contingency	5% of Construction Subtotal				$32,213	$19,465		
Scope Contingency	5% of Construction Subtotal				$32,213	$19,465		
CONSTRUCTION TOTAL					$740,900	$447,702		
Permitting and Legal	1% of Construction Total				$7,409	$4,477		
Services During Construction	5% of Construction Total				$37,045	$22,385		
TOTAL IMPLEMENTATION COSTS					$785,354	$474,565		
Engineering and Design	10% of Total Implementation Costs				$78,535	$47,456		
TOTAL ESTIMATED COSTS					$863,890	$522,021		$0

	ARC	ADC	TOTAL	
TOTAL PRESENT WORTH OF COSTS*	$863,890	$522,021	$1,385,911	

Notes:
* Net present worth of costs includes total capital cost and total present worth O&M cost.

APPENDIX III
ADMINISTRATIVE RECORD INDEX

HORSESHOE ROAD COMPLEX SITE
ADMINISTRATIVE RECORD
INDEX OF DOCUMENTS

1.0 SITE IDENTIFICATION

1.1 Background - RCRA and other Information

p. 100001-100030 Plan: Site Analysis, Horseshoe Road Site, Sayreville, New Jersey, prepared by The Bionetics Corporation, prepared for U.S. EPA, Region II, October 1991.

3.0 REMEDIAL INVESTIGATION

3.4 Remedial Investigation Reports

p. 300001-300379 Report: Final Remedial Investigation Report, Horseshoe Road Complex Site, Remedial Investigation/Feasibility Study, Sayreville, New Jersey, Volume I, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, May 12, 1999.

p. 300380-300471 Report: Final Remedial Investigation Report, Horseshoe Road Complex Site, Remedial Investigation/Feasibility Study, Sayreville, New Jersey, Volume II, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, May 12, 1999.

p. 300472-301098 Report: Final Remedial Investigation Report Horseshoe Road Complex Site Remedial Investigation/Feasibility Study, Sayreville, New Jersey, Volume III, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, May 12, 1999.

P. 301099-301729 Report: Final Remedial Investigation Report Horseshoe Road Complex Site Remedial

Investigation/Feasibility Study, Sayreville, New Jersey, Volume IV, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, May 12, 1999.

p. 301730-302422 Report: Final Remedial Investigation Report Horseshoe Road Complex Site Remedial Investigation/Feasibility Study, Sayreville, New Jersey, Volume V, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, May 12, 1999.

p. 302423-302563 Report: Stage I Cultural, Resources Survey, Horseshoe Road Complex Site, Borough of Sayreville, Middlesex County, New Jersey, prepared by Richard Grubb & Associates, Inc., prepared for CDM Federal Programs Corporation, May 1, 1998.

p. 302564-302595 Report: Final Wetland Delineation Report for the Horseshoe Road Complex Site, Borough of Sayreville, Middlesex County, New Jersey, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, July 25, 1997.

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

p. 400001-400113 Report: Final Focus Feasibility Study, Horseshoe Road Complex Site, Remedial Investigation/ Feasibility Study, Sayreville, New Jersey, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, September 24, 1999.

P. 400114-400430 Report: Final Baseline Human Health Risk Assessment Horseshoe Road Complex Site, Remedial Investigation/Feasibility Study, Sayreville, New Jersey, Volume I, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, October 6, 1999.

4.4 Proposed Plans

p. 400431-400442 Letter to Mr. Richard Caspe, Director, U.S. EPA, Region II, from Mr. Anthony J. Farro, Director, Division of Publicly Funded Site Remediation, State of New Jersey, Department of Environmental Protection, re: Horseshoe Road Superfund Site, Draft Proposed Plan-Buildings and Structures, September 15, 1999, (Attachment: Draft Superfund Proposed Plan, Horseshoe Road Site, Sayreville, New Jersey, prepared by U.S. EPA, September 1999.)

10.0 PUBLIC PARTICIPATION

10.2 Community Relations Plans

p. 10.0001-10.0042 Plan: Final Community Relations Plan, Horseshoe Road Complex Superfund Site, Sayreville, New Jersey, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, August 1998.

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4.0 FEASIBILITY STUDY

4.4 Proposed Plans

P. 400443 - 400455 Plan: Superfund Proposed Plan, Horseshoe Road Site, Sayreville, New Jersey, prepared by U.S. EPA, Region II, December 1999.

4.6 Correspondence

P. 400456 - 400458 Letter to Mr. John Osolin, Remedial Project Manager, U.S. EPA, Region II, from Mr. Donald J. Camerson, II, Bressler, Amery & Ross, re: Horseshoe Road Site, Sayreville, New Jersey, Superfund Proposed Plan - December 1999, February 1, 2000.

10.0 PUBLIC PARTICIPATION

10.3 Public Notices

P. 10.0043 - 10.0043 Public Notice: EPA Invites Public Comment on the Proposed Cleanup of Horseshoe Road Superfund Site, Borough of Sayreville, Middlesex County, New Jersey, prepared by U.S. EPA, Region II, published in Home News and Tribune, December 22, 1999.

10.4 Public Meeting Transcripts

P. 10.0044 - 10.0161 Transcript: Proposed Plan, Public Meeting, Transcript of Proceedings, In the Matter of: Horseshoe Road Superfund Site, Sayreville, New

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p. 300380-300471 Report: Final Remedial Investigation Report Horseshoe Road Complex Site Remedial Investigation/Feasibility Study, Sayreville, New Jersey, Volume II, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, May 12, 1999.

p. 300472-301098 Report: Final Remedial Investigation Report Horseshoe Road Complex Site Remedial Investigation/Feasibility Study, Sayreville, New Jersey, Volume III, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, May 12, 1999.

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p. 302423-302563 Report: Stage I Cultural Resources Survey, Horseshoe Road Complex Site, Borough of Sayreville, Middlesex County, New Jersey, prepared by Richard Grubb & Associates, Inc., prepared for CDM Federal Programs Corporation, May 1, 1998.

P. 302564-302595 Report: Final Wetland Delineation Report for the Horseshoe Road Complex Site, Borough of Sayreville, Middlesex County, New Jersey, prepared by CDM Federal Programs Corporation, prepared for U.S. EPA, Region II, July 25, 1997.

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P. 400456 - 400458 Letter to Mr. John Osolin, Remedial Project Manager, U.S. EPA, Region II, from Mr. Donald J. Camerson, II, Bressler, Amery & Ross, re: Horseshoe Road Site, Sayreville, New Jersey, Superfund Proposed Plan - December 1999, February 1, 2000.

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10.4 Public Meeting Transcripts

P. 10.0044 - 10.0161 Transcript: Proposed Plan, Public Meeting, Transcript of Proceedings, In the Matter of: Horseshoe Road Superfund Site, Sayreville, New

Jersey, Wednesday, January 19, 2000, prepared by Betsy Weston Court Reporting Services, prepared for U.S. EPA, Region II, undated.

10.5 Documentation of Other Public Meetings

P. 10.0162 - 10.0165 U.S. EPA, Public Meeting, Horseshoe Road Superfund Site, Sign-In Sheet, January 19, 2000.

10.6 Fact Sheets and Press Releases

P. 10.0166 - 10.0168 Press Release: EPA Seeks Public Comment on Cleanup Plan for Aboveground Structures at Superfund Site on Horseshoe Road in Sayreville, New Jersey, prepared by U.S. EPA, Region II, Wednesday, December 22, 1999.

10.10 Correspondence

P. 10.0169 - 10.0169 Memorandum to Mr. John Osolin, Remedial Project Manager, U.S. EPA, Region II, from Mr. Vincent Zarcaro, Jr., re: Horseshoe Road Superfund Site, Sayreville, NJ, January 21, 2000.

APPENDIX IV
RESPONSIVENESS SUMMARY

HORSESHOE ROAD AND ATLANTIC RESOURCES SITES
SAYREVILLE, MIDDLESEX, NEW JERSEY
RESPONSIVENESS SUMMARY

A. Overview

As part of its public participation responsibilities, the U.S. Environmental Protection Agency (EPA) held a public comment period from December 22, 1999 to February 3, 2000, for interested parties to comment on EPA's Proposed Plan to address the buildings and structures at the Horseshoe Road and Atlantic Resources sites in Sayreville, New Jersey. EPA also conducted a public meeting on January 19, 2000. The Proposed Plan described the alternatives that EPA considered, including EPA's preferred alternative: demolition of the buildings and structures, and offsite recycling or disposal of the building materials.

In addition to comments received during the public meeting, EPA received written comments throughout the public comment period. Judging by the comments received, most of the community supports EPA's preferred alternative. However, written comments from potentially responsible parties (PRPs) expressed their opinion that the actions EPA proposed were not warranted by the levels of contamination found at the site.

The responsiveness summary contains the following sections:

A. OVERVIEW
B. BACKGROUND OF COMMUNITY INVOLVEMENT
C. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES
   - Part I: Summary and response to local community concerns
   - Part II: Comprehensive Response to Specific Legal and Technical Questions
D. REMAINING CONCERNS

B. BACKGROUND OF COMMUNITY INVOLVEMENT

In December 1997, EPA distributed a fact sheet discussing the site history, past clean-up activities, and the ongoing investigation activities at the site. This fact sheet also mentioned a public availability session scheduled for early 1998.

On March 31, 1998, EPA held a public availability session at the Sayreville Public Safety Complex. During the session, EPA representatives answered questions and listened to community concerns.

In March and April 1998, EPA conducted interviews with area residents, town and county officials, and members of local environmental groups. EPA also established an information repository in the Sayreville Public Library, which contains technical reports and other important site documents.

EPA helped form a Community Advisory Group (CAG) in March 1999, in an effort to keep the community informed of EPA's efforts and to solicit comments and information from the effected community. The CAG meets several times per year to discuss EPA findings and site activities. The CAG is expected to continue advising EPA of community concerns during the remedial design, remedial action and for future site remedies.

As mentioned above, EPA released a Proposed Plan for addressing the buildings and structures on December 22, 1999. A public comment period was held from December 22, 1999 to February 3, 2000. A public meeting was held on January 19, 2000. The comments received from the public and EPA's responses can be found in the next section of this summary.

C. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

Part I Summary and Response to Local Community Concerns

1. **Oral Comment:** Several local residents were concerned about the slab foundations that will be left in place, and the contaminated soil beneath them. They wondered what will prevent the contamination beneath the slabs from spreading, and when will the slabs themselves be addressed.

   EPA Response: *Leaving the slab foundations in place, and sealing them if necessary, is intended to be an interim action. Since EPA will be addressing the site soils in a subsequent operable unit, the decision was made to leave the foundations in place as a protective barrier, rather than removing them and exposing the soils beneath to trespassers, surface water runoff, and infiltration by rain. After surface cleaning, EPA expects the slabs to be as clean or cleaner than the surrounding surface soils. If the slabs turn out to be more contaminated than the surrounding soil, they will be sealed to prevent exposure. The slabs themselves will be addressed with the soils and groundwater, in the proposed plan for the second operable unit, which is planned for 2000.*

2. **Oral Comment:** One resident asked if during the past EPA removal actions, EPA's trucks hauled the drums and contaminated debris for off-site disposal along the Horseshoe Road, and through the residential neighborhood located there. In addition, the resident asked if the truck traffic could be routed differently for future cleanup work at the site.

   EPA Response: *Most if not all the material removed from the site was taken out along Horseshoe Road. EPA requires that many steps be taken to ensure that contamination is not tracked off the site. These steps include the following: all vehicles that enter contaminated areas are thoroughly washed down before leaving the site; highly contaminated material is placed in overpack drums before it is placed on the truck; and trucks are typically tarped and the waste carefully loaded to ensure that debris and dust cannot fall or be blown out.*

   Although EPA believes that the precautions that will be taken to prevent contamination of off-site areas via truck traffic are effective, EPA will look into several traffic route options that may allow a bypass of the residential areas, especially for the subsequent Operable Units, when the truck traffic is anticipated to be much heavier.

3. **Oral Comment:** A resident asked if EPA could sample in the adjacent residential neighborhood, since most of the truck traffic (during operations at the site and EPA cleanups) probably went through the neighborhood streets. In addition, dirt bikers from the neighborhood were reported to ride on the sites and then wash off their bikes on the neighborhood streets. She also expressed a concern that during the flood events site contaminants could have been washed into the neighborhood.

   EPA Response: *As part of EPA's extensive investigation of the site, topographic mapping of the area was performed to determine flood zones and area runoff patterns. Based on these investigations, EPA has determined that the site contamination could not be carried from the site into the neighboring residential area. Furthermore, during Hurricane Floyd, which was approximately a 100-year flood event, the river did not rise enough to effect any of the on-site areas beyond those areas already covered by marsh.*

However, because Horseshoe Road was used to transport material to the site, and the recent the motorbike activity, EPA has initiated plans to take samples in the residential areas along the Horseshoe Road. This sampling event should take place in August 2000. The actual sampling will take one or two days to complete, and the validated results should take a month or two to process.

4. **Oral Comment:** A representative of Edison Wetlands Association expressed concern over the time required to clean up the sites, and that this planned action was not addressing the wetlands and river. He requested that EPA take action in these areas concurrently with the building demolition.

EPA Response: *EPA is currently working on plans to address the onsite soils and groundwater, which is designated as operable Unit Two (OU2). A Proposed Plan for OU2 is planned for the end of 2000. OU2 will address those areas considered sources of contamination to the marsh and river.*

After the results of the initial investigation were evaluated, EPA determined the marsh to be one of the most contaminated areas on the site. However, there were many gaps in the data that prevented a thorough understanding of the nature of the contamination in the marsh and the adjacent Raritan River. Concurrently with the OU2 work, EPA is gathering and evaluating data to determine the site's impacts to the marsh and river, designated as OU3. Preliminary data from animal tissues indicate that the current levels of contamination are not acute.

5. **Oral Comment:** A resident asked how long it would take to address the soil contamination after the buildings are removed.

EPA Response: *EPA is currently working on plans to address the on-site soils and groundwater (OU2). EPA currently expects to present the Proposed Plan to the public In the end of 2000. The Record of Decision usually follows within three or four months of the Proposed Plan, and design can take a year or more depending on the complexity. The construction. would begin when the design is complete and could last from several months to several years depending on the remedy selected.*

6. **Oral Comment:** The representative from Edison Wetlands Association also asked whether EPA would be replacing the hay bales that washed out during Hurricane Floyd, in September 1999.

EPA Response: *The hay bales were suggested by the Army Corps of Engineers as an interim measure to increase the filtering efficiency of the phragmites marsh to prevent contamination from spreading into the river. EPA replaced the hay bales in June 2000.*

EPA is currently investigating whether there is still a significant amount of contaminated sediment being carried to the marsh and river. Current contaminant distribution data suggests that most of the material released from the site occurred during the facility operations and the vast majority of the contamination found in the marsh and river is from historical releases.

7. **Oral Comment:** One resident was concerned about the potential for contaminated dust to be liberated during the building demolition. He was concerned that the wind could blow contaminated dust into the residential neighborhood. He also wanted to know how he could be sure that any accidental release would reported to the community.

EPA Response: *EPA will be employing active dust suppression methods such as watering down the area to keep the dust down, tarping exposed areas where dust can be picked up by the wind, and encapsulating or covering material loaded on trucks before they leave the site. In addition, EPA will establish acceptable dust levels, and employ air monitoring during the on-site work to ensure that dust levels are kept down. If EPA's acceptable levels are exceeded during monitoring, EPA will stop the site operations well before the levels are high enough to present a problem. Work will not resume until the problem is remedied. EPA will also keep records of the monitoring results, which will be available to the public.*

8. **Oral Comment:** A resident asked how the cleanup would be funded, and whether the parties responsible for the contamination would be paying to cleanup the site.

EPA Response: *Under the Superfund law, EPA is required to look for generators and transporters of contaminants that lead to Superfund releases, as well as site owners and/or*

operators. Entities that are identified as parties responsible for uncontrolled releases are to be held liable for the cost of the cleanup.

EPA has recovered costs incurred during some of the removal activities from potentially responsible parties (PRPs) associated with the Atlantic Resources Corporation site (ARC). EPA may offer these PRPs the opportunity to perform the ARC portion of the remedy, or pursue some other enforcement action. EPA will continue to look for viable PRPs for the Horseshoe Road site and for the ARC site; however, those areas that have no viable PRPs would be paid for through the Superfund program. If at a later date EPA locates PRPs for these areas, EPA can pursue them to recover cleanup costs.

9. **Oral Comment:** A resident asked whether the residents would be notified in the event of a hazardous release from the site.

EPA Response: *All structures to be addressed by the building demolition have been thoroughly investigated. Drums and tanks containing hazardous materials have been removed in previous removal actions. Therefore, there is little danger of a release during the OU1 building demolition. However, EPA is required to have emergency plans in place that will enable EPA to respond quickly to emergencies. These plans include listing the proper authorities to notify in the event an evacuation is needed. Local police and emergency responders would provide help to EPA to notify areas nearby of any danger. In addition, there will always be telephones out at the site during site work, to ensure prompt notification of emergency responders in the event of an emergency. EPA will relay its emergency response plans to the community through the Community Advisory Group meetings as the plans are developed.*

10. **Oral Comment:** The Raritan River Keeper stated that while EPA is addressing buildings on the site, they are doing nothing to address releases to the river. He expressed concern that people are eating crabs and fish from the river that may be contaminated by chemicals from the Horseshoe Road site. He asked if EPA could address the river sooner, and suggested that we work from the river back to the site instead of the opposite.

EPA Response: *EPA's cleanup approach is to address the contaminant sources first and then cleanup the residual contamination. This approach prevents the source areas from recontaminating those areas which have already been addressed.*

EPA has sampled crabs and fish from the river to assess whether the current fish advisory is protective in the river just off the Horseshoe Road and Atlantic Resources sites. The results of EPA's crab and fish samples have been shared with the Agency for Toxic Substances and Disease Registry (ATSDR), which is responsible for health assessments, and health consultations; and the New Jersey Department of Environmental Protection (NJDEP), which is responsible for fish advisories. A preliminary review of the data indicates that the levels of PCBs in the crabs are significantly lower than the Food and Drug Administration's criteria of 2 parts per million, on which the state's fish advisory is based. EPA is currently evaluating all of the fish and crab data which will be presented in an addendum to the risk assessment. A copy of this data will also be placed in the administrative record file, which is available to the public.

11. **Oral Comment:** Several residents asked why it has taken so long to clean up the site.

EPA Response: *Since 1985, when NJDEP requested that EPA take the lead for the site, EPA has performed 10 removal actions that removed the acute chemical hazards and greatly reduced the level of site contamination. The Horseshoe Road site was listed on the National Priorities List in September 1995, and EPA began its Remedial Investigation in the summer of 1997, to identify and address what remained at the site after the removal actions were completed.*

To date, the most highly contaminated site materials have been addressed through removal actions. What remains is the residually contaminated soil, groundwater, and sediments. While these contaminated media are not as toxic as the material already removed, they require more effort and planning to address.

12. **Oral Comment:** One resident asked why Alternative 2 (Off-site disposal) will take only two months, and alternative 3 (Off-site disposal and recycling) takes 13 months.

EPA Response: *The two-month time frame was due to a misprint in the Proposed Plan. The implementation time for Alternative 2 should read 12 months. The difference between the two alternatives is that under Alternative 3 all recyclable material will be recycled when feasible, while under Alternative 3 all material will be landfilled. The one-month difference accounts for the extra time it will take to separate and sample the material to be recycled.*

13. **Oral Comment:** One interested citizen asked if the Health and Safety Plan would address wind-blown asbestos, and whether she would be able to review the plan.

EPA Response: *The plan will address asbestos as well as other wind-blown contaminants. Provisions will be made to protect both workers and residents. EPA will make copies of the Work Plans and Health and Safety Plans available for review through the Community Advisory Group.*

14. **Oral Comment:** A resident asked if polychlorinated biphenyls (PCBs) would show up in blood tests of people who had been previously exposed to contamination at the site.

ATSDR Response: *(This question was posed to ATSDR) ATSDR stated that in order for it to show up in a blood test, the patient would have to request that PCBs be included in the screening. If that were done, a significant recent exposure could be detected. However, the blood test would not show PCB levels for exposures that occurred years ago, like the exposures that occurred during operations at the facilities on these sites (pre-1985).*

15. **Oral Comment:** A representative from the Edison Wetlands Association asked if EPA planned to relist the ARC site on the NPL.

EPA Response: *EPA is still evaluating its options. The data from the Remedial Investigation indicates that the contamination from ARC and the Horseshoe Road site are intermingled in the groundwater and in the marsh. In addition, material found at the Horseshoe Road Dump are related to operations at ARC. Thus at a minimum, a coordinated effort would be required to address these sites.*

16. **Oral Comment:** A representative of Edison Wetlands Association asked ATSDR whether the site surface soils presented a threat to people who trespass on the site.

ATSDR Response: *ATSDR's representative indicated that he did not consider the site soils to be an acute hazard to trespassers. ATSDR indicated that long term exposures (exposures over many years) to some of the surface soil contaminant concentrations at the site could present a risk.*

17. **Oral Comment:** As a follow up question to 16, the Edison Wetlands Association representative asked EPA if it would be correct to assume that since the site has been around for 30 or so years, and people have been trespassing on the site during that time, some people must have exceeded their "exposure quota" for some of the site contaminants.

EPA Response: *It is not possible to accurately evaluate past exposures because the necessary human health data is typically not available. Since EPA can only mitigate current and future exposures, it is neither accurate or helpful for EPA to speculate on past exposure levels. EPA's focus is to prevent current and future exposures. (ATSDR's response to this question during the public meeting can be found on page 102 of the Public Meeting Transcripts.)*

18. **Oral Comment:** One resident asked what kind of security will be implemented during the period these buildings are being knocked down.

EPA Response: *During periods that the site cleanup is underway, EPA will provide security.*

19. **Oral Comment:** A resident asked why access roads to the site can't be gated to prevent vehicle access.

EPA Response: *Some of the more accessible entrance routes are gated. In addition to the process areas at the Atlantic Resources Corporation and Atlantic Development Corporation areas, where higher contaminant levels can be found, have been completely gated to vehicle traffic. The road that leads from the Middlesex County Utility Authority (MCUA) property to the New Jersey Steel facility is an access and inspection road for the MCUA force main beneath the road, and the MCUA needs access to it. Gates will stop larger vehicles but not smaller recreational vehicles, like motorcycles. Because the road also provides access for*

police and emergency vehicles, EPA has not insisted that this access road be fenced. EPA has placed signs along the road to ensure that people traveling on it are aware of the site, and the dangers posed by the contamination.

20. Written Comment: One resident wanted clarification as to which of the areas of the sites were to be addressed by the proposed action.

EPA Response: *This first operable unit will address buildings and structures, which can be found only in the Atlantic Resources Corporation, and Atlantic Development Corporation areas. The second operable unit will address soil and groundwater throughout the Horseshoe Road and Atlantic Resources sites. EPA plans to address the off-site marsh and Raritan River in subsequent operable units.*

Part II: Comprehensive Response to Specific Legal and Technical Questions

21. Written Comment: A letter from potentially responsible parties (PRPs) for the Atlantic Resources site questioned EPA's authority under CERCLA to include the Atlantic Resources site in its Remedial Investigation, Focused Feasibility Study, and Proposed Plan, when it is not on the National Priorities List (NPL).

EPA Response: *The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR §300.425, allows EPA to conduct remedial planning activities, including remedial investigations, feasibility studies or proposed plans, at non-NPL sites. EPA may also perform cleanup work at non-NPL sites under its removal authorities or under an enforcement action with a third party.*

22. Written Comment: The PRPs also stated that EPA had not presented evidence that supports either listing the Atlantic Resources site independently or incorporating it into the Horseshoe Road site. The PRPs disagree with conclusions that the Atlantic Resources site is a source of contamination found at the Horseshoe Road site.

EPA Response: *The purpose of the Proposed Plan is not to present evidence for purposes of NPL listing.(EPA's procedures for listing sites on the NPL are described in the NCP.)EPA has not determined how best to address the Atlantic Resources site. While investigating the nature and*

extent of contamination at the Horseshoe Road Dump area, material associated with the Atlantic Resources Corporation was discovered. The location of the dump, and the material found dumped there, indicate that the Atlantic Resources facility was the source of some of the waste found there.

In addition to the apparent dumping, data from the site remedial investigation indicates that groundwater contaminated with organic chemicals (vinyl chloride, chlorobenzene and 1,2,4-trichlorobenzene for example), that originates under the Atlantic Resources facility moves toward the marsh, and can be found under the Horseshoe Road Dump. This demonstrates that the Atlantic Resources site is a source of groundwater contamination for the Horseshoe Road Dump Area.

23. **Written Comment:** The PRPs pointed to the results of samples taken beneath the Atlantic Resources buildings and stated that, in most cases, the results were not elevated above New Jersey non-residential surface soil standards. On the basis of these results, the PRPs dispute that the [preferred alternative] is driven by any actual or threatened release of hazardous substances from the buildings. Rather, the remedy is proposed to address the deteriorated condition of the buildings and the elimination of the buildings as a possible attractive nuisance. Such a concern is not environmental in nature and is not one of the concerns which CERCLA is intended to address. The parties conclude by questioning whether the proposed remedy is consistent with CERCLA or the National Contingency Plan.

EPA Response: *While EPA considers the New Jersey residential and non-residential surface soil standards as To Be Considered criteria, EPA evaluates threats posed by sites by developing site-specific human health and ecological risk assessments. A human health risk assessment for the sites has been incorporated as part of the Administrative Record for this ROD; EPA is currently preparing an ecological endangerment assessment for the sites. EPA elected to propose a response for the on-site buildings, structures and other surface debris as a first step in an overall site strategy. The need to take response actions at these sites is based upon actual or threatened releases of hazardous substances at the sites, including releases or threatened releases associated with the buildings, structures and other debris that are the subject of this remedy.*

This action is consistent with CERCLA and the NCP, in that it is a discrete operable unit being taken as a first action within the overall management strategy for the sites. The NCP (40 CFR §300.430) directs EPA as follows:

> Sites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction quickly, when phased analysis and response is necessary or appropriate given the size and complexity of the site, or to expedite the completion of total site cleanup.

The selected remedy clearly satisfies the intent of the NCP in this regard. While this operable unit will not result in substantial risk reduction at the sites, these are large and complex sites that will take multiple operable units to address. EPA could have delayed the selection of a remedy for the buildings, structures and other debris until ready to propose an action for the soils or groundwater, but elected to segregate out a portion of the site so as to expedite the total site cleanup.